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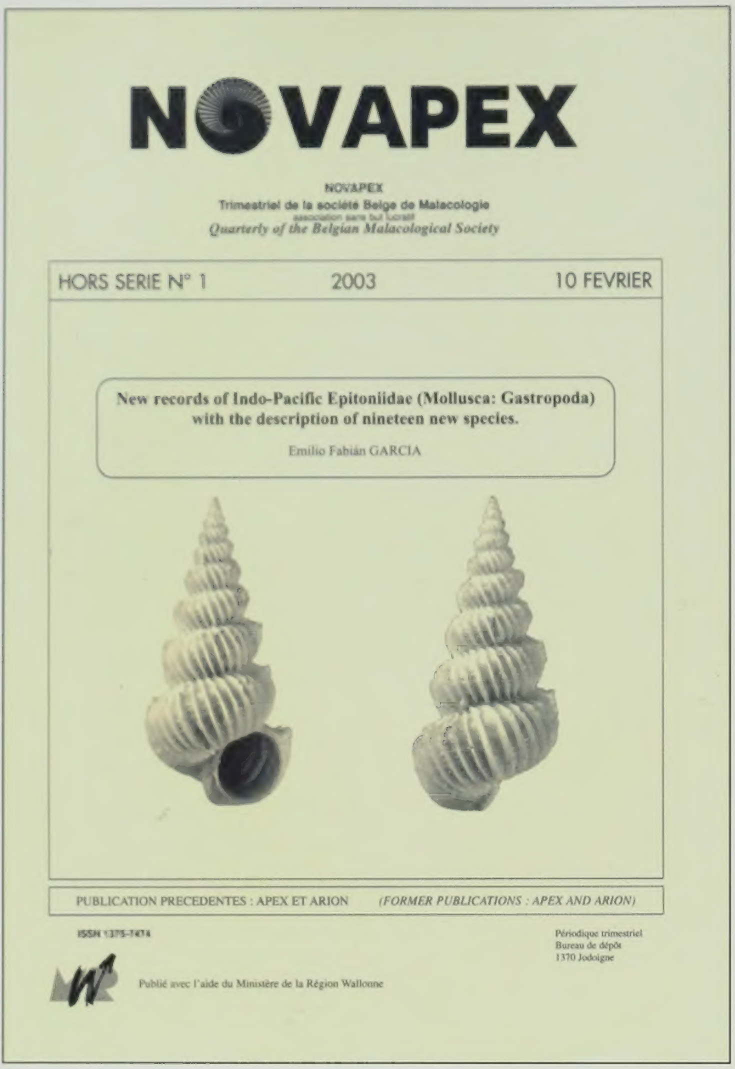

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New records of Indo-Pacific Epitoniidae (Mollusca: Gastropoda) with the description of nineteen new species.

Emilio Fabián GARCIA

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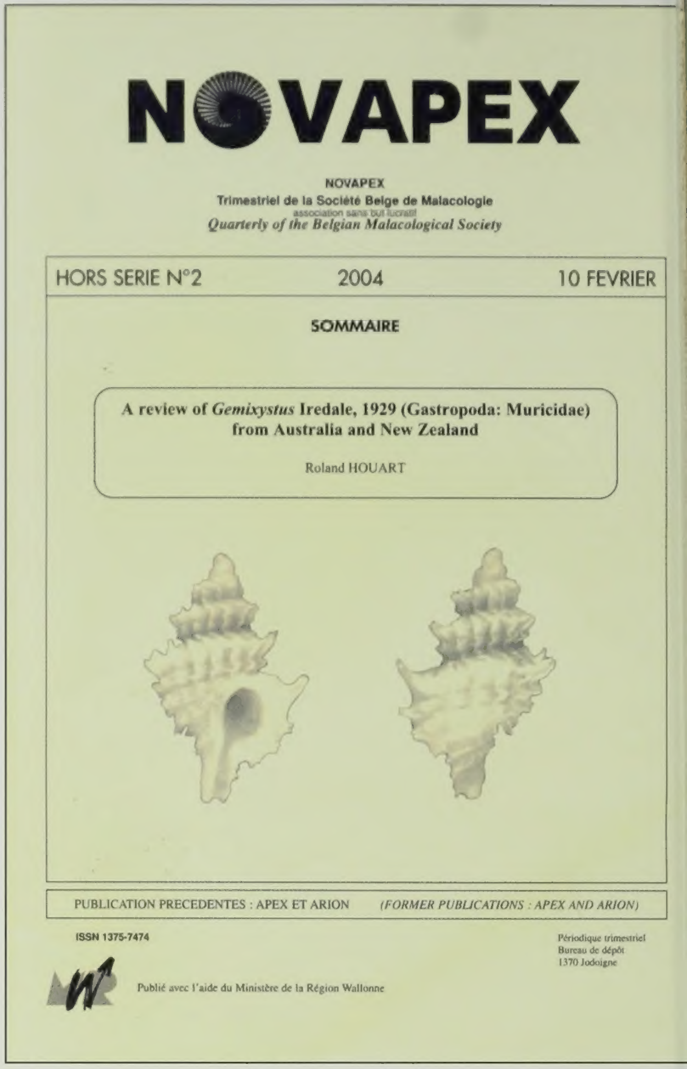

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A review of *Gemixystus* Iredale, 1929 (Gastropoda: Muricidae) from Australia and New Zealand

Roland HOUART

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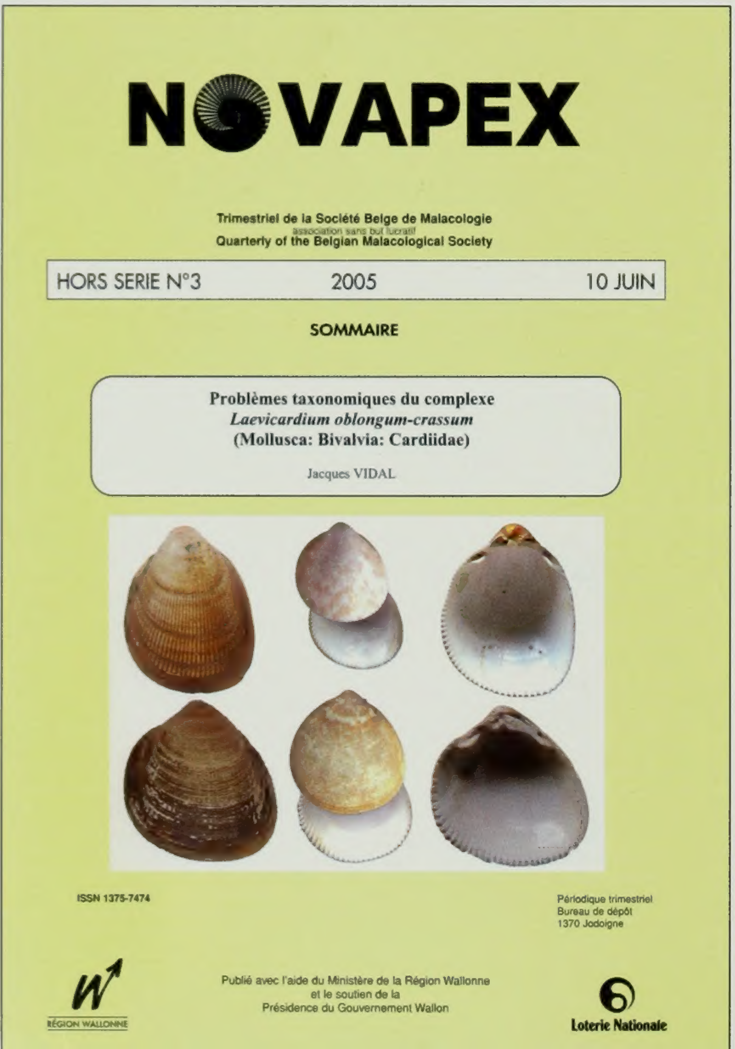

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Jacques VIDAL

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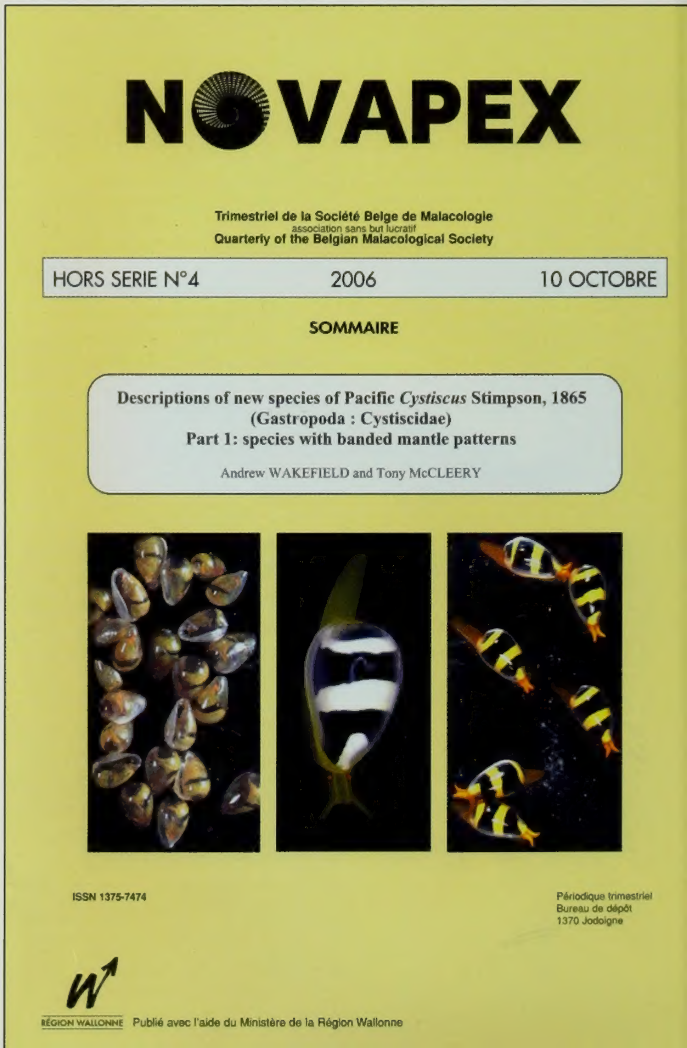

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Andrew WAKEFIELD and Tony McCLEERY

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E. F. GARCIA NOVAPEX 9 (1): 1-15, 10 avril 2008

Eight new molluscan species (Gastropoda: Turridae) from the western Atlantic, with the description of two new genera

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KEYWORDS. Gastropoda, Turridae, Mangeliinae, *Acmaturris*, *Suturocythara*, *Crassipirinae*, *Darrylia*, *Miraclathurella*, *Viridrillia*, Gulf of Mexico, Caribbean, Bahamas, Florida, new genera, new species, new combinations.

ABSTRACT. Two new turrid genera are described: *Suturocythara* n. gen., assigned to Mangeliinae, and *Darrylia* n. gen, assigned to Crassispirinae. Eight new turrid species are described: *Acmaturris annaclaireleeae* n. sp., *Acmaturris pelicanus* n. sp., *Agathotoma ecthymata* n. sp., *Suturocythara apocrypha* n. sp., *Suturocythara redferni* n. sp., *Darrylia harryleei* n. sp., *Miraclathurella clendenini* n. sp., and *Viridrillia aureofasciata*, n. sp . *Drillia kleinrosa* Usticke, 1962 is assigned to the new genus *Darrylia*. *Agathotoma (Viridrillia) klasmidia* Shasky, 1971, and *A. (V.) secalis* Shaski, 1971, from the Panamic Province, are assigned to the new genus *Suturocythara*. All new genera and species are compared with similar taxa.

INTRODUCTION

When this study began, the goal was to describe three new turrid species from the Gulf of Mexico. However, in order to elucidate challenges encountered when trying to find generic placements, other undescribed conspecific material and congeneric taxa were uncovered and all has been incorporated in this report.

The eight turrid species described herein are small, inconspicuous species that were collected by the methodical search of sediment. Three of the species were collected during dredging expeditions in Bahía de Campeche, southwestern Gulf of Mexico in the summer of 2005, and in the northeastern Gulf of Mexico during the summer of 2006. Both expeditions were undertaken on board the R/ V *Pelican*, a research vessel managed by LUMCON, the Louisiana Universities Marine Consortium. The Campeche cruise and its findings have been reported elsewhere (García, 2006, 2007b). The 2006 expedition covered the offshore waters from Louisiana to Tampa, Florida. It produced 272 species assigned to 44 families. Of these, the best represented are the turrids, with 39 species, of which some represent extensions of their known geographic distribution (García, 2007a). Others are yet to be identified. Also described here is an *Acmaturris* collected in a 2004 dredging campaign at Sackett Bank, one of Louisiana's many rich, deep-water banks. Sackett Bank has produced some 100 species of mollusks, 19 of which are turrids. This is the first *Acmaturris* species to be recorded from the Gulf of Mexico. The Gulf of Mexico material was extracted from several hundred kilos of sediment dredged between 60 and 94 m. A second species of *Acmaturris* inhabiting the Bahamas and the southern Caribbean is also described here.

One of the three original Gulf of Mexico turrid species which defied generic placement has been assigned to a new genus shared with a hitherto undescribed Bahamian species, a single specimen of which was collected by Colin Redfern, author of *Bahamian Seashells* (2001), in more than 30 years of collecting in the area. The genus *Suturocythara* n. gen. is proposed here for these two species, which share protoconchs fully ornamented with vermiform elements, a shoulder area where the whorls rise above the level of the suture, and a calloused, protruding anal sinus. Although assigned to Mangeliinae, their shape is not unlike some species of the genus *Kermia*, an Indo-Pacific genus belonging in the subfamily Raphitominae. The Gulf of Mexico species has also been found on the southeastern coast of Florida.

A second undescribed Gulf of Mexico species had been originally assigned to *Miraclathurella*; however, when it was compared with two other Recent western Caribbean species seemingly congeneric, an obvious discrepancy was detected. The Gulf species has been tentatively left in *Miraclathurella*, but the other two species have been assigned to *Darrylia* n. gen. Both genera share a broad protoconch with strong axial ribs but *Darrylia* lacks spiral ornamentation in the protoconch and a sutural cord.

A third undescribed Gulf of Mexico species was represented by a single specimen dredged in Campeche Bay; however, when images were sent to Harry G. Lee, of Jacksonville, Florida, and Colin Redfern, of Boca Raton, Florida, I was supplied by them with numerous samples of the species. While Redfern had obtained his specimens during many years of collecting in Abaco Is., Bahamas area, Dr. Lee had obtained his from a wider range, almost one at a time, through the generosity and unselfishness of his many shell-collecting friends. Although the species has a paucispiral protoconch, suggesting limited larval distribution, it has been found from the Gulf of Mexico to the Bahamas and the British Virgin Islands, as well as south to off the coast of Nicaragua.

The *Viridrillia* species described here, dredged off the Alabama coast, is the largest and most colorful in the genus, and is the first species assigned to *Viridrillia* reported from the northern half and southwestern quadrant of the Gulf of Mexico; the only other species inhabits the southeastern corner, off the Florida Keys.

The taxonomic complexity exemplified by the turrid taxa treated in this study underscores the challenges that this family presents. It also indicates the underestimated diversity of the molluscan fauna of the western Atlantic and the possibilities of new discoveries that lay ahead.

Although Taylor et al., 1993 proposed a classification that moved some subfamilies of Turridae into Conidae and elevated others, such as Drilliinae, to familial status, subsequent workers (Kohn & McLean, 1994; Rosenberg, 1998) have questioned their conclusions. I have retained here the traditional classification of Turridae, as a consensus has not yet been reached.

All the specimens treated in this study were collected as empty shells unless otherwise stated.

Abbreviations

ANSP: Academy of Natural Sciences, Philadelphia, Pennsylvania, USA.
BMSM: Bailey-Matthews Shell Museum, Sanibel, Florida, USA.
CR: Colin Redfern collection, Boca Raton, Florida, USA.
EFG: author's collection.
FSBC I: Florida Fish and Wildlife Conservation Commission - Florida Wildlife Research Institute (FWC-FWRI), St. Petersburg, Florida, USA.
HGL: Harry G. Lee collection, Jacksonville, Florida, USA.
FSBC: Florida Department of Natural Resources, St. Petersburg, Florida, USA.
LACM: Los Angeles County Museum, Los Angeles, California, USA.
SBMNH: Santa Barbara Museum of Natural History, California, USA.
UF: University of Florida, Florida Museum of Natural History, Gainsville, Florida, USA.
USNM: National Museum of Natural History, Smithsonian Institution, Washington, DC, USA.

SYSTEMATICS

Superfamily **CONOIDEA** Fleming, 1822
Family **TURRIDAE** Swainson, 1840
Subfamiy **MANGELIINAE** Fischer, 1887
Genus ***Acmaturris*** Woodring, 1928

Type species: *Acmaturris comparata* Woodring, 1928 (by original designation).

Acmaturris annaclaireleeae **n. sp.**

Figs 1-4

Type material. Holotype UF 412553 , length 3 mm, width 1.3 mm (Figs 1-4), Klein Bonaire, Netherlands Antilles, in 43 m. Paratypes: 1 BMSM 15496, Cape Eleuthera, Eleuthera Island, Bahama Islands, in 39 m.

Type locality. Klein Bonaire, Netherlands Antilles, in 43 m.

Distribution. Klein Bonaire, "ABC Islands," Netherlands Antilles, and Eleuthera Island, Bahamas, in 39-43 m.

Description. Holotype 3 mm in length, relatively strong, fusiform (width/ length ratio 0. 43. Protoconch (Fig. 4) white, broadly conical, of about 2.25 whorls; first whorl smooth, with irregularly placed pimple-like ornamentation; thin, obliquely arcuate axial riblets appearing at end of second whorl; termination of protoconch determined by appearance of spiral ornamentation. Teleoconch of about 2.75 whorls; whorls widely shouldered, sharply angular, slightly constricted anteriorly. Suture inconspicuous. Axial ornamentation of 11 or 12 round, narrow, arcuate ribs; ribs about 1/3 as wide as interspaces. Spiral ornamentation of well-defined, round cords; cords about 1/2 as wide as axial ribs; 3 such cords on early whorls, increasing to 10 on last whorl; cords forming strong reticulated pattern when crossing axial ribs, creating small nodes at intersections; secondary cords contnuing on anterior canal. Shell surface covered with microscopic, scabrous axial and spiral ornamentation, creating a secondary reticulated pattern, giving surface a frosted appearance. Aperture narrow, long, approximately 1/2 length of shell, anterior canal slightly produced posteriorly; labrum moderately thin, incurved, then erect, slightly crenulated, re-enforced behind by a well-defined, rounded, narrow varix; shell ornamentation extending over surface of varix; stromboid notch lacking; anal sinus pronounced, wide, deep, somewhat rectangular in shape (Fig. 2); parietal wall smooth, weakly callused (Fig. 2). Shell crystalline-white.

Discussion. This and the following species have been placed in *Acmaturris* because of their similarity in shell form to the type species, strongly clathrate macrosculpture with a "frosted" microsculpture in the interspaces, strongly varicose lip with a crenulated thin edge, and a thickened sinus edge adjoining parietal shelf

The paratype of *Acmaturris annaclaireleeae*, from Eleuthera Is., Bahamas, measures 2.9 mm, and has all of the characters of the holotype. The long distance between the two locations suggests that this species is widely spread in the western Atlantic. The two type specimens were found by Dr. Lee from sediment collected by L. R. Zylman while SCUBA diving.

The small size separates this species from all other *Acmaturris*. *Acmaturris brisis* Woodring, 1928, a fossil species described from the Bowden beds, Jamaica but reported from the Recent fauna of Amapá, Brazil (Rosenberg, 2008), grows to 8.3. *Acmaturris sagena* (Dall, 1927), a species inhabiting deep water off Georgia, grows to 5 mm, and has a smooth nucleus of 1.5 whorls. *Acmaturris pelicanus* n. sp. (Figs 5-9), grows to 4.4 mm, is relatively wider (width/ length ratio 0.45), and has a stronger reticulated pattern and a coarser microsculpture.

Etymology. Named for Anna Claire Lee, baby granddaughter of the well-known conchologist Harry G. Lee, of Jacksonville, Florida. Dr. Lee brought the new species to my attention and donated the type material to the repository institutions.

Acmaturris pelicanus n. sp.

Figs 5-9

Type material. Holotype ANSP 416413 (Figs 5-9), length 4.4 mm, width 2 mm.

Type locality. Louisiana. Sackett Bank, 28°38.16'N, 89°33.19'W, in 60-70 m.

Distribution. Known only from the type locality.

Description. Holotype 4.4 mm in length, strong, widely fusiform (width/ length ratio 0.45). Protoconch (Fig. 9) somewhat eroded, white, of approximately 2.25 whorls; first whorl presumably smooth; strong, wide, arcuate axial cords appearing on second whorl; cords as wide as interspaces; termination of protoconch determined by appearance of spiral ornamentation. Teleoconch of about 3.5 whorls; whorls convex, shouldered. Suture inconspicuous. Axial ornamentation of 10 or 11 strong, widely rounded ribs; ribs as wide as interspaces. Spiral ornamentation of narrow, well-defined cords; cords forming reticulated pattern as they cross axial elements, creating strong nodes at intersections; 3 such cords on early whorls, increasing to 8 on last whorl, cords continuing on anterior canal. Shell surface covered with numerous microscopic axial and spiral threads, creating a secondary reticulated, nodose pattern (Fig. 8). Aperture relatively narrow, occupying 1/2 length of shell; anterior canal wide; labrum thin, erect, slightly crenulated, re-enforced behind with strong, wide, rounded varix; shell ornamentation extending over surface of varix; stromboid notch lacking; anal sinus relatively deep, wide; parietal wall smooth, slightly callused. Shell white

Discussion. The small size and widely fusiform shape separate this species from most other *Acmaturris* species. Only *Acmaturris annaclaireleeae* n. sp. (Figs 1-4) and *A. sagena* (Dall, 1927) are near the size of *A. pelicanus*; however, A. *annaclaireleeae* is smaller, narrower, and has a different sculpture; and *A. sagena* is slightly larger, narrower, has a protoconch of 1.5 whorls, and has a different microsculpture. The latter species has been collected off Georgia, reportedly in 538 to 805 m.

Etymology. Named for the R/V *Pelican*, the research vessel used in the cruise when the new species was obtained.

Genus ***Agathotoma*** Cossman, 1899
Type species: *Mangelia angusta* Jan in Bellardi, 1848 (by subsequent designation).

Agathotoma ecthymata n. sp.

Figs 10-18

Type material. Holotype ANSP 416414, length 5 mm, width 2 mm (Figs 10-13). Paratypes: 3 CR 3320, 3368, 3334, Treasure Cay, Abaco Is., Bahamas; 1 BMSM 15497,Treasure Cay, Abaco Is., Bahamas, 26°40.00'N, 77°18.15'W, 0-1 m; 1 CR 3367, Treasure Cay, Abaco Is., Bahamas 26°39.45'N, 77°17.55'W, 1 m (Figs 14-15); 1 CR 12494, south of "Don't Rock", Abaco Is., Bahamas, 26°.40.31'N, 77°15.16'W, 3.5 m; 1 USNM 1109964, Guana Cay, Abaco Is., Bahamas, 26°40.50'N, 77°08.05'W, 2 m, live; 1 HGL coll., Norman's Cay, Exuma, Bahamas; 1 HGL coll., east of St. Augustine, St. John Co. Florida, 40 m; 1 EFG 28091, Bahía de Campeche, Gulf of Mexico, 20°51.49'N, 92°21.44'W, 63-65 m (Figs 16-17); 1 CR 8072, Guana Cay, Abaco Is., Bahamas, 26°41.15'N, 77°10.10'W.

Type locality. Bahama Ids., Abaco Is., Treasure Cay, 26°40.00'N, 77°18.15'W, 0-1 m.

Other material examined. Bahama Ids.Abaco Is., Sandbank Creek, 26°39.35'N, 77°18.12'W, 2 m (EFG), 1; Airport Beach, Eleuthera (HGL), 1; South Ridge Rock, Cay Sal, 20 m (HGL), 1; west side of Cape Eleuthera, Eleuthera Is., Bahamas, 39 m (HGL), 1; "The G. Spot," French Cay, Turks and Caicos, 20 m (HGL), 1; Bloody Bay Wall, Little Cayman Is., Cayman Ids., 20 m (HGL), 1. **Belize**. Deadman's Reef, Turneffe Id, 20 m (HGL), 1. **British Virgin Islands.** Deadman Chest, 18 m (HGL, Fig. 18), 1. **Colombia.** Isla Providencia, western Santa Catalina Is., 13°27'N 81°21'W, 27 m (HGL), 1.

Distribution. Southwestern Gulf of Mexico to the British Virgin Islands, and south to Isla Providencia, Colombia, from 26°40'N to 13°27'N; from 64°44''W to 92°22'W, in 0-65 m.

Description. Holotype 5 mm in length, moderately strong, turreted (width/ length ratio 0.42) (Figs 10-13).

Protoconch white, of 1.5 whorls; apical tip spherical, irregularly sculptured with pimple-like projections (Fig. 12); projections subsequently increasing in number and strength, at times aligning spirally; whorl soon developing convex shoulder and nearly flat sides; 2 or 3 weak axial folds appearing at termination of protoconch. Beginning of teleoconch defined by appearance of scabrous spiral ornamentation and slight carina; remainder of teleoconch of 4.5 whorls; whorls strongly shouldered, angular, slightly narrowing anteriorly. Suture impressed, obscured by shell ornamentation. Axial sculpture of 9 or 10 wide, slightly slanted ribs; ribs as wide as interspaces on first whorl, becoming narrower, more defined on later whorls, stronger at shoulder. Surface of shell covered with numerous narrow, imbricated spiral threads (Fig. 13). Aperture elongated; outer lip thin, strengthened behind by strong, dorso-ventrally compressed varix which wraps around relatively wide, round anal sinus; sinus not constricted at aperture; anterior canal wide, short. Shell white, with three equidistant, indistinct, reddish bands: below periphery of shoulder, at mid-body, and at beginning of anterior canal; color strongest on labral varix, almost absent elsewhere.

Discussion. Some species tentatively assigned to *Pseudorhaphitoma* Boettger, 1895 (Kilburn, 1993: 319), an Indo- Pacific genus, have a protoconch ornamented with prickly granules not unlike the protoconch ornamentation of *Agathotoma ecthymata*, as well as a teleoconch of scabrous spiral threads (e.g., *P. obscurata* Kilburn, 1993: 343, figs 47-48); however, these species have teleoconch whorls that are not tapering anteriorly, have axial ribs that are continuous from whorl to whorl, similar to the genus *Ithycythara*, and have a more claviform outline, with a wider, shorter, more anteriorly produced aperture. *Agathotoma angusta* (Jan in Bellardi, 1848) (Figs 20-22), the type species of *Agathotoma*, lacks the pimple-like projections of *Agathotoma ecthymata*, its whorls are convex, without anterior tapering, its spiral ornamentation is finer, less scabrous, and its anal sinus is deeper and more pronounced; therefore, I am only tentatively assigning the new species to *Agathotoma*.

Agathotoma ecthymata grows to 6 mm. Some specimens are solid white, but this may be due to color fading. The intensity of coloration and width of the bands is also variable. A strongly colored specimen from Treasure Cay, Abaco, Bahama Ids. (Fig. 14) has a yellow protoconch with white tip (Fig. 15); its first teleoconch whorl is orange and the second reddish; wide maroon bands appear on the shoulder and at mid-body of the last whorl, less conspicuously at the anterior canal. These highly colored specimens are similar to specimens identified as *Agathotoma candidissima* forma *badia* (Reeve, 1846) by Jong & Coomans (1988:114; pl. 44, Fig. 605), and as *A. badia* (Reeve, 1846) by Díaz & Puyana (1994: 227; pl. LXVII Fig. 899). I have not inspected those specimens; however, they do not conform with Reeve's description (1846: species 90) and illustration of *Mangelia badia* (Fig. 19; Reeve pl. 8).

Although the squarish profile and pimple-like projections of the protoconch are constant, some protoconchs, such as that of the holotype, have most projections irregularly arranged, while others have most of them spirally aligned. Since both designs can be found in the same protoconch I have not considered this difference to be worthy of specific differentiation. The strength of the projections also varies considerably. This is presumed to be in part because of erosion. A protoconch extracted from sediment in the British Virgin Islands, and now in the collection of H. G. Lee, is an example of both the strength that the ornamentation can achieve as well as the combination of spirally aligned and irregularly arranged projections.

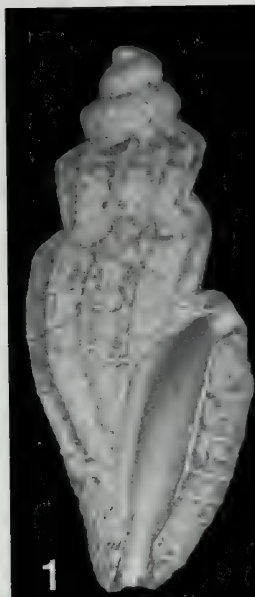
The paucispiral protoconch with its pimple-like ornamentation separates this species from similar species. *Agathotoma candidissima* (C. B. Adams, 1845) can easily be confused with this species; however, *A. candidissima* (Fig. 23) has a larger,widely conical protoconch of 2.5 whorls with thin, arcuate axial cords (Fig. 24), usually has a more elongated last whorl, and axial ribs that raise slightly above shoulder, creating a coronated pattern . *Agathotoma castellata* (E. A. Smith, 1888) is also similar; however, the syntype of this species shows less numerous, narrow, well-defined axial ribs and a more convex last whorl, not as contricted anteriorly as that of *A. ecthymata*.

Agathotoma ecthymata has been collected alive in sediment taken from under rocks in 12 m, and from sand and grass in 1 to 3.5 m (Redfern, pers. comm.).

Etymology. From the Greek *ekthymatos* (noun, meaning pimple), used here as an adjective meaning "pimpled", referring to the ornamentation of the protoconch.

Figures 1-11

1-4. *Acmaturris annaclaireleeae* n. sp., Klein Bonaire, Netherlands Antilles, in 43 m. Holotype UF 412553; length 3 mm, width 1.3 mm. Protoconch scale bar: 200 µm. **5-9.** *Acmaturris pelicanus* n. sp., Sackett Bank, Louisiana, 28°38.16'N, 89°33.19'W, in 60-70 m. Holotype ANSP 416413; length 4.4 mm, width 2 mm. Protoconch scale bar: 300 µm. **10-11.** *Agathotoma ecthymata* n. sp., Abaco Id., Treasure Cay, Bahamas, 26°40.00'N, 77°18.15'W, 0-1 m. Holotype ANSP 416414; length 5 mm, width 2 mm.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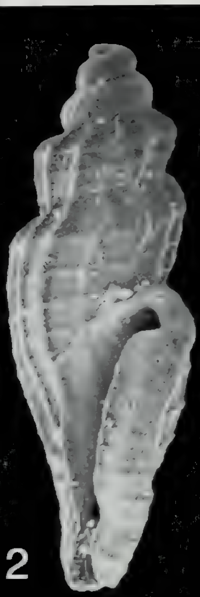
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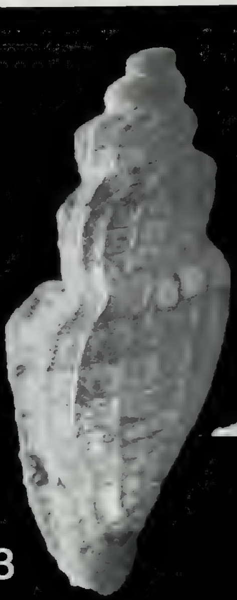
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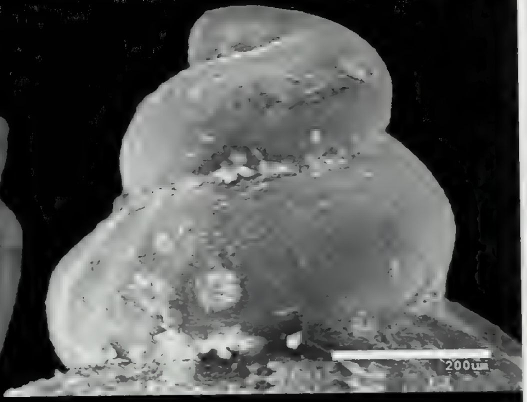

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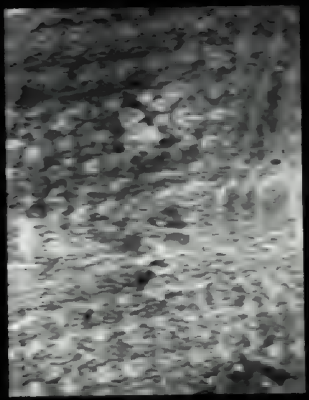
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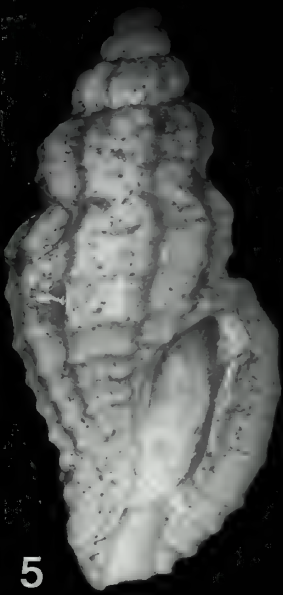
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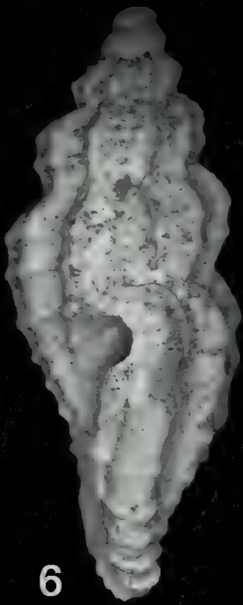
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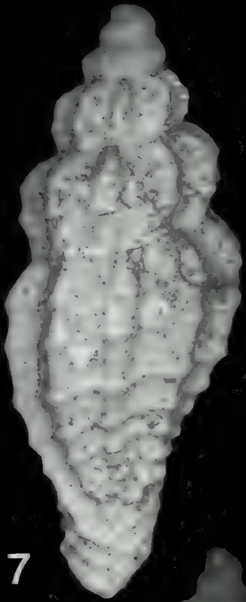
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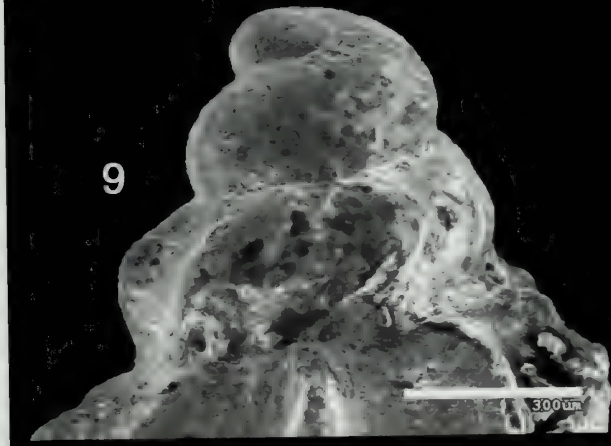

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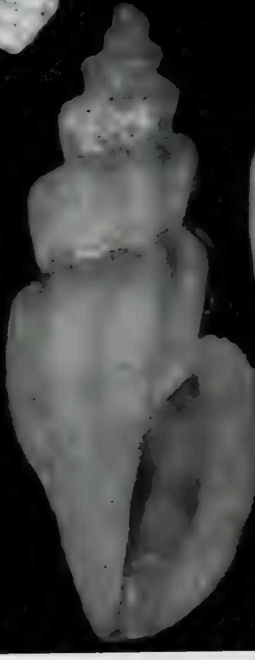
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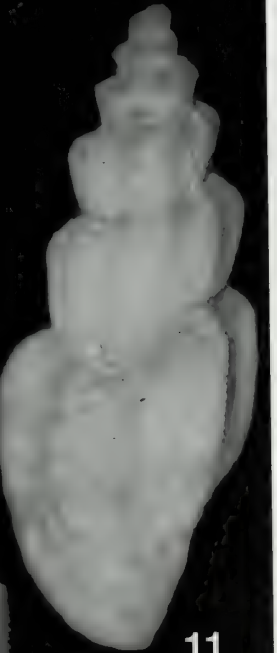
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Suturocythara n. gen.
Type species: *Suturocythara redferni* n. sp.

Description. Shell small, less than 5 mm in length, strong, elongate- cylindrical. Protoconch of 1.25 to 3 shouldered whorls, sculptured with irregular or spirally aligned vermiform threads, seen only under SEM and/ or thin, arcuate axial riblets . Teleoconch of 3.5 to 4 whorls; whorls with strong, rounded shoulders that rise above sutural line, giving suture a "sunken" appearance; early whorls straight sided anteriorly. Axial sculpture of strong, somewhat sinuous ribs; ribs rising above suture, particularly on early whorls, creating an undulating pattern. Spiral sculpture of evenly spaced cords; cords narrower than axial elements, creating a strong to weak reticulated pattern when crossing axial ribs; secondary spiral threads showing in interspaces. Aperture elongate- ovate, less than half of total shell length; anterior canal short, wide; outer lip crenulated by terminals of spiral sculpture, re-enforced behind by a rounded varix, devoid of denticles inside aperture. Anal sinus spout-like, round, conspicuously protruding at shoulder, heavily calloused posteriorly. Shell usually white, rarely colored with irregular axial stripes.

Discussion. Two heretofore undescribed western Atlantic species are assigned to this genus: *Suturothythara redferni* and *S. apocrypha*. Two Panamic species, *Agathotoma (Vitricythara) secalis* Shasky, 1971(Fig. 37), and *A. (V.) klasmidia* Shasky, 1971 (Fig. 38) are also assigned to *Suturocythara*. Although *Suturocythara klasmidia* n. comb. does not obviously show the more salient characters of the new genus, it has a protoconch similar to that of the type species (see Figs 31-32, 39-40), early teleoconch whorls with a "submerged" suture (Shasky, 1971:71), straight-sided anteriorly; and an ornamentation that, although not obviously reticulated, has a pattern of strong axial ribs crossed by "major and minor fimbriated spiral threads" (Shasky, 1971:71), every fifth thread larger. Were the differences in strength between major and minor threads more obvious, the shell ornamentation would be like that of the other species assigned to *Suturocythara* (see Figs 30, 36), including that of *S. secalis* n. comb.

The genus *Agathotoma* is similar to *Suturocythara*; however, *Mangelia angusta* Jan in Bellardi, 1848 (Figs 20-22), the type species for *Agathotoma*, has a protoconch of smooth early whorls, with later whorls showing only arcuate axial elements (Fig. 22), its spiral ornamentation consisting of numerous, equal-sized, minute threads that do not create a clathrate pattern on the shell surface; its shoulders do not have the channeled appearance created by the elevated axial elements (which also gives the suture a "sunken" look); and its sinus is U-shaped, not constricted at aperture (Fig. 21).

The genus *Vitricythara* is also similar to the new genus; however, species assigned to *Vitricythara* have a "steeply conical" protoconch (Fig. 26), a differently structured shoulder, axial and spiral elements of almost equal value (Fig. 25), and an anal sinus that is broad, "subdued" (Fargo, 1953:395).

Suturocythara is superficially similar to the Indo-Pacific genus *Kermia* Oliver, 1915 in its elongated shape, general sculpture and strong anal sinus. However, species assigned to *Kermia* have a diagonally cancellated protoconch and an outer lip with denticles in the aperture.

Etymology. From the Latin *sutura* (noun, meaning seam), in reference to the structure of the shoulder, which emphasizes the sutural area; and *Cytherea*, Latin, a name for Aphrodite, commonly used for mangeliine turrid genera.

Suturocythara redferni n. sp.
Figs 27-32

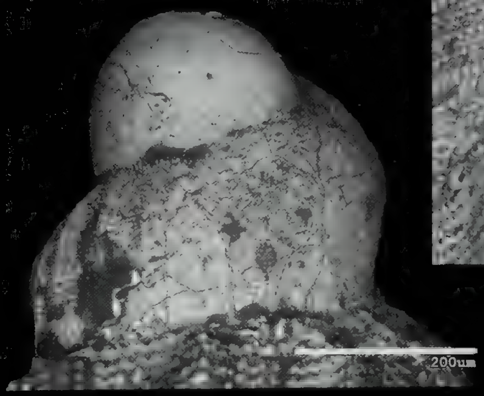
Type material. Holotype ANSP 416412 length 4 mm, width 1.5 mm (Figs 27-32).

Type locality. Bahama Islands, Abaco, off Guana Cay, in 53 m.

Distribution. Known only from the type locality

Figures 12-26

12-18. *Agathotoma ecthymata* n. sp., **12.** Protoconch of holotype. Scale bar: 200µm. **13.** Close-up of sculpture of holotype. **14-15.** Treasure Cay, Abaco Id., Bahamas, 26°39.45'N, 77°17.55'W, 1 m, 5.1 mm (CR 3367).**16-17.** Bahía de Campeche, Gulf of Mexico, Mexico, 20°51.49'N, 92°21.44'W, 63-65 m, 3.2 mm, EFG 28091. Protoconch scale bar: 200µm. **18.** Deadman Chest, British Virgin Islands. Sediment sample 18 m. (HGL, *ex* M. Loper). Protoconch only scale bar: 200µm. **19.** Original figure of *Mangelia badia* Reeve, 1846. **20-22.** *Agathotoma angusta* (Jan in Bellardi, 1848) Lower Pliocene: Zanclean; Campore: Parma. Italy, 5.7 mm. Protoconch scale bar: 300µm. **23-24.** *Agathotoma candidissima* (C. B. Adams, 1845). After Leal (1991, pl. 24). Protoconch scale bar: 100µm. **25-26.** *Vitricythara auberiana* (d'Orbigny, 1832), 28° 03.439'N, 92° 26.978'W 71-74 m, EFG 23382, 4.1 mm. Protoconch scale bar: 200µm.



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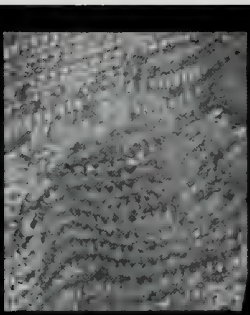

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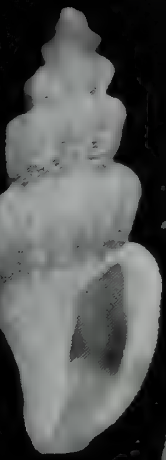

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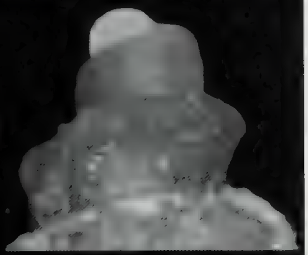

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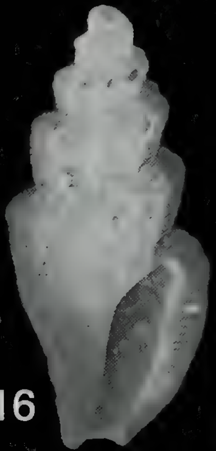

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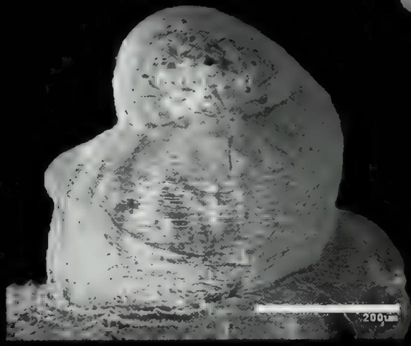

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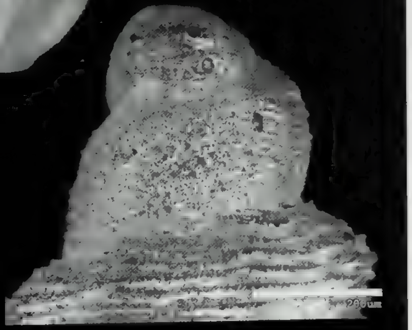

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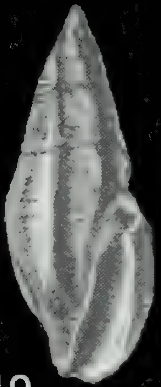

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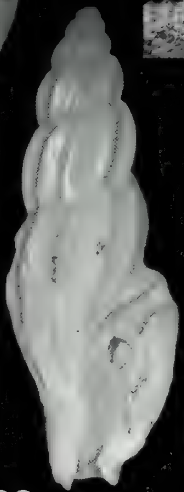

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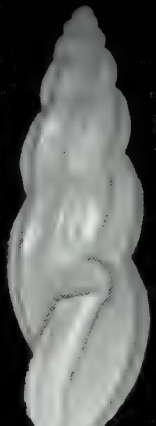

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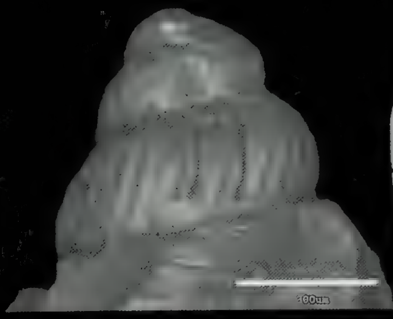

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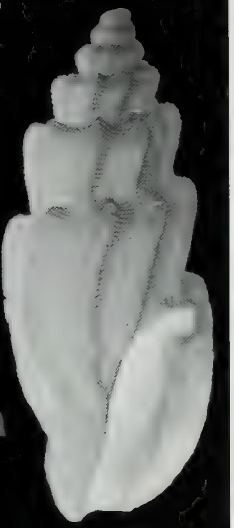

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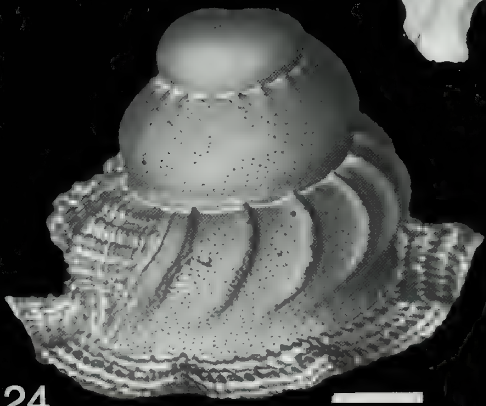

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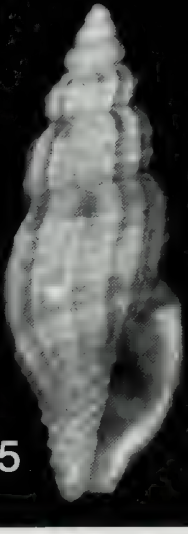

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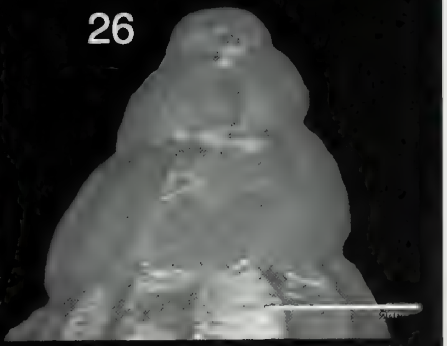

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Description. Holotype 4 mm in length, strong, elongate- ovate (width/ length ratio 0.37) (Figs 27-29). Protoconch of about 2.25 whorls, turbinate, ornamented with thin, arcuate axial costae (Fig. 31); spaces between costae with irregular, slanted lines and crowded, irregular, vermiculate structures seen only under SEM (Fig. 32); beginning of nucleus white, remainder of protoconch yellowish-orange. Teleoconch of about 4 whorls; whorls straight at periphery, shouldered; shoulder rising slightly above suture. Suture submerged under shoulder structure. Axial sculpture on early whorls composed of numerous, rounded ribs; ribs as wide as interspaces, diminishing in number and strength on later whorls, becoming mere undulations on last two whorls, evident mainly at shoulder. Spiral ornamentation of narrow, well-defined cords starting on first teleoconch whorl; cords slightly nodulose, narrower than interspaces, increasing in number on following whorls; about 22 on last whorl, covering from suture to anterior end; cord interspaces ornamented with 3 or 4 scabrous spiral threads (Fig. 30). Aperture elongate-ovate; outer lip incurved, with shallow stromboid sinus near anterior end (Fig. 28), strengthened behind by a thick varix; varix wrapping around projecting, spout-like anal sinus; spiral ornamentation of last whorl continuing over surface of varix; sinus projecting about a 45°angle from axis of shell; parietal wall smooth, slightly calloused; anterior canal short but well-defined, wide, narrowing posteriorly. Shell white, with irregular, axially oriented yellowish-orange stripes; widest stripe appearing behind lip, occupying almost one forth of last whorl.

Discussion. The characteristic structure of the sutural area, as well as the protruding, spout-like, heavily calloused sinus, separate this species from most mangeliine western Atlantic turrids. Only *Suturocythara apocrypha* n. sp. has these features; however, the protoconchs, the coloration, and the surface ornamentation of the two species differ. The Panamic species *Suturocythara secalis* n. comb. (Fig. 37) is similar to *S. redferni*; however, the former grows to 7 mm, has a protoconch of 3 whorls, has a stronger reticulated ornamentation, and is “whitish” in color.

This species has appeared as *Agathotoma* sp. C in Redfern (2001: 131, pl. 59, Fig. 541).

Etymology. Named for Colin Redfern, of Boca Raton, Florida, author of *Bahamian Shells*, for his contribution to malacology and discoverer of this species.

Suturocythara apocrypha n. sp.

Figs 33-36

Type material. Holotype ANSP 416415 length 4.5 mm, width 1.5 mm (Figs 33-36), 20°00.35’N, 92°26.10’W, 73-77 m. Paratypes: 1 ANSP 306436, W. of Campeche, Yucatán Peninsula, Mexico, in 32 m; 1 ANSP 416417, 1 EFG 26627, 20°51.16'N, 92°26.28'W, 93-94 m;1 BMSM 15498, 1 SBMNH 83342, 20°52.40'N, 92°24.83'W, 77-81 m.

Type locality. Mexico, Bahía de Campeche, 20°00.35’N, 92°26.10’W, 73-77 m.

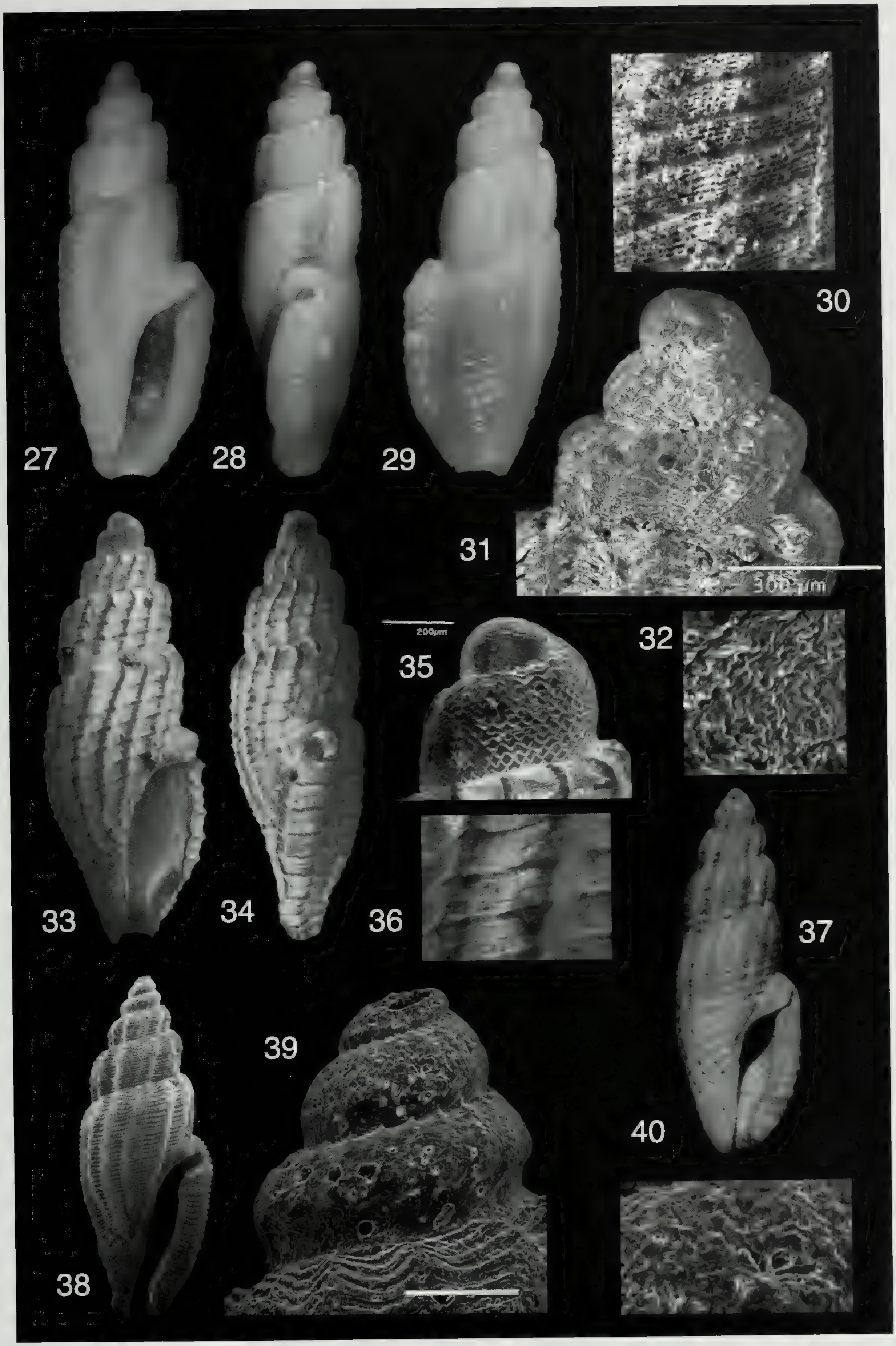
Other material. Belize.Turneffe Island (HGL). **USA.** Delray Beach, southeast Florida, 2 specimens (HGL); West Palm Beach, southeast Florida (Williams, 2006, sp. No.9033).

Distribution. Bahía de Campeche, southwestern Gulf of Mexico, 73-94 m to the southeast coast of Florida, and south to Belize.

Description. Holotype 4.5 mm in length, strong, elongate-ovate (width/ length ratio 0.33) (Figs 33-36). Protoconch white, paucispiral, of 1.25 whorls, with somewhat square profile; nucleus bulbous, profusely sculptured with irregular vermiform threads; threads later becoming spirally oriented, giving appearance of a diagonally cancellated pattern as undulations of spiral threads coalesce (Fig. 35); demarcation between protoconch and teleoconch determined by abrupt change in sculpture. Teleoconch of approximately 3.25 whorls; whorls with strong, rounded shoulders and almost straight sides at periphery. Suture submerged by shoulder sculpture. Axial sculpture of strong, slightly sinuous ribs; ribs narrower than interspaces, extending posteriorly above suture

Figures 27-40

27-32. *Suturocythara redferni* n. sp., Abaco, off Guana Cay, Bahama Id., in 53 m. Holotype ANSP 416412; length 4 mm, width 1.5 mm. Protoconch scale bar: 300µm.**30.** Close-up of sculpture of teleoconch. **32.** Close-up of sculpture of protoconch. **33-36.** *Suturocythara apocrypha* n. sp., Bahía de Campeche, Mexico, 20°00.35’N, 92°26.10’W, 73-77 m. Holotype ANSP 416415; length 4.5 mm, width 1.5 mm. Protoconch scale bar: 200µm. **36.** Close-up of sculpture of teleoconch. **37.** *Suturocythara secalis* (Shasky, 1971) n. comb., Olas Altas Bay, Mazatlán, Sinaloa, Mexico. Holotype, 7 mm. After Shasky 1971, fig 9. **38-40.** *Suturocythara klasmidia* (Shasky, 1971), n. comb., San Carlos, Guaymas, Sonora, Mexico, SBMNH dr 17f, ex Poorman coll., 5mm. Protoconch scale bar: 200µm.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creating an undulated pattern; about 12 such ribs on penultimate whorl; ribs on last whorl extending to base of shell, where they curve right. Spiral sculpture of narrow, evenly spaced spiral cords; cords narrower than interspaces creating elongated nodes, as well as a reticulate pattern, when crossing over axial elements; interspaces ornamented with 3 or 4 spiral threads (Fig. 36). Aperture narrowly ovate, 2.1 mm in length; labrum re-enforce behind by thick varix; ornamentation of last whorl continuing over varix; spiral elements crenulating edge of labrum; stromboid notch shallow; anal sinus strong, circular, constricted at aperture (Fig. 34), strongly callused posteriorly; anal canal relatively short, wide. Shell white.

Discussion. The holotype was chosen because it has the best preserved protoconch; however, it has a slightly damaged lip and does not clearly show the weak stromboid sinus that appears in an adult specimen measuring 4.3 mm. Two other paratypes show the same protoconch structure of the holotype; the others have an eroded protoconch. Otherwise, all four paratypes conform to the characters of the holotype.

Differences between the new species and species of the genus *Kermia* have been discussed in the description of the genus. *Suturocythara apocrypha* n. sp. can only be confused with its western Atlantic congener *S. redferni* n. sp.; however, their protoconchs are different (compare Figs 31 and 35), their teleoconch sculpture is different (compare Figs 30 and 36), and they have different coloration.

Etymology. From the Greek *apocryphos* (adjective, meaning, unauthentic) in reference to the misleading ornamentation of the protoconch, which superficially resembles the diagonally cross- hatched ornamentation of species assigned to the subfamily Raphitominae.

Subfamily **CRASSISPIRINAE** Morrison, 1966
Genus ***Darrylia*** n. gen.
Type species: *Darrylia harryleei* n. sp.

Description. Shell small, claviform, whorls slightly shouldered; subsutural cord absent. Nuclear whorls broad, stout, of 1.5; beginning of nucleus smooth, followed by strong, wide, protracted axial ribs. Teleoconch of relatively wide axial ribs, crossed by narrower spiral cords; cords creating elongated nodes when crossing axial ornamentation. Aperture elongate-ovate, occupying about one third length of shell. Sinus deep, constricted at aperture, calloused posteriorly. Lip thickened behind by strong varix; stromboid notch shallow but conspicuous; strong denticle present at beginning of anterior canal, constricting opening.

Discussion. In addition to the type species the other member of the genus is *Darrylia kleinrosa* (Usticke, 1969). The radula of *Darrylia* is not known. The genus has been placed tentatively in Crassispirinae because of the similarities of its members with other genera assigned to that subfamily.

The genera *Lioglyphostoma* Woodring, 1928 and *Miraclathurella* Woodring, 1928 are similar to *Darrylia*, as these two genera have a thickened varix behind the lip. *Lioglyphostoma* differs from the new genus in having a longer anterior canal, a relatively larger aperture with a wider last whorl, and a protoconch of about 3. 5 smooth, rapidly enlarging whorls, the last whorl carinated. *Miraclathurella* has a strong sutural cord, a stronger stromboid notch, and a longer aperture. Although *Darrylia kleinrosa* has been placed in *Miraclathurella* by DeJong & Coomans (1988: 116), the species lacks a sutural cord and has a definite claviform shape, with a relatively small aperture and short anterior canal. Moreover, the obvious denticle at anterior end of aperture is uncharacteristic of *Miraclathurella*.

Darrylia is similar to the Panamic genus *Maesiella* McLean, 1971 in general shell shape, strong labral varix, and ribbed protoconch; however, *Maesiella* has a subsutural cord, a wider, more ovate shell, a proportionately longer aperture, and a protoconch with diagonal axial ribs on the third whorl.

Etymology. Named for my colleague, Darryl L. Felder, Head of the Biology Department at the University of Louisiana at Lafayette and an internationally known researcher in crustaceans. Dr. Felder‘s invitations to join him in numerous research cruises in the Gulf of Mexico have allowed me to obtain material for my studies for more than a decade.

Darrylia harryleei **n. sp.**

Figs 41-45

Type material. Holotype ANSP 416409 length 5.9 mm, width 2.1 mm (Figs 41-45). Paratypes: 1 ANSP 416416, 1 SBMNH 83343, 1 LACM 3088, 2 EFG 12518, “The Key”, Oakridge, south-central Roatán Is., Bay Ids., Honduras, 0 m; 1 USNM 1109963, 1 UF 412556, 1 BMSM 15495, 1 EFG 13865, 2 FSBC I 066901, 5 H. G. Lee coll., Caribe Bight, south-central Roatán Is., Bay Islands, Honduras, 0.2 m; 2 EFG 13848, Halfmoon Bay, south-central Roatán Is., Bay Ids., Honduras, 1-1.5 m.

Type locality. “The Key”, Oakridge, south-central Roatán Island, Bay Islands, northern Honduras, 0.2 m.

Distribution. South-central coast of Roatán Island, Bay Islands, northern Honduras, in 0.2- 1 m.

Description. Holotype 5.9 mm in length, strong, elongate-fusiform (width/ length ratio 0.35) (Figs 41-43). Protoconch white, broad, stout, shouldered, paucispiral, of 1.5 whorls; tip of nucleus smooth; prosocline axial ribs soon developing, persisting for remainder of protoconch (Fig. 45); ribs wider than interspaces, narrowing later; demarcation between protoconch and teleoconch inconspicuous, indicated by appearance of nodes on axial ribs. Teleoconch of approximately 4.25 convex whorls. Suture well impressed, slightly undulated by axial ribs. Axial sculpture of strong nodose ribs; ribs wider than interspaces; 10 such ribs on penultimate whorl. Spiral sculpture starting on first teleoconch whorl as aligned nodes on axial ribs, becoming recognizable, conspicuous cords by second whorl; cords undulating, creating strong, elongated beads as they cross over axial elements, stronger at periphery; 7 such cords on penultimate whorl, 17 on last whorl. Aperture elongate- ovate; outer lip thin, re-enforced behind by strong varix, showing tenuous stromboid notch towards anterior end; strong, spirally elongated denticle developing inside lip immediately anterior to stromboid notch, constricting beginning of anterior canal (Fig. 44); deep, rounded sinus showing at shoulder, sinus calloused posteriorly, constricted at aperture. Shell pale tan, with irregular brown blotches; blotches darker at interspaces, tending to form a band at shoulder.

Discussion. The paratypes follow the characters of the holotype. The largest paratype measures 7.7 mm. The new species is most similar in size and general shape to *Darrylia kleinrosa* (Usticke, 1969)n. comb. (Figs 46), which also develops a strong denticle at posterior edge of anterior canal (Fig. 48); however, *D. kleinrosa* has a different protoconch structure (Fig. 47), is pink in coloration, has less convex whorls, and a more subdued ornamentation. The protoconch of *Darrylia harryleei* is similar to that of *Miraclathurella clendenini* n. sp. (Fig. 51); however, the latter grows larger, has a more concave shoulder showing a subsutural cord, different axial and spiral ornamentation, and different coloration.
All of the specimens were found under rubble, inhabited by hermit crabs.

Etymology. Named for Dr. Harry G. Lee, of Jacksonville Florida, for his numerous contributions to malacology and for his continuous support of my research.

Genus ***Miraclathurella*** Woodring, 1928
Type species: *Miraclathurella vittata* Woodring, 1928 (by original designation).

***Miraclathurella clendenini* n. sp.**
Figs 49-51

Type material. Holotype ANSP 416411 length 8.2 mm, width 3.2 mm (Figs 49-51). Paratypes: 1 ANSP 416418, 2 FSBC I 066900, 1 LACM 3087, 2 USNM 1109965, 2 BMSM 15494, 1 SBMNH 83341, 2 UF 412554, 2 HGL coll., 2 EFG 26628, Bahía de Campeche, 20°51.49'N, 92°21.44'W, 63-65 m.

Type locality. Bahía de Campeche, 20°51.49'N, 92°21.44'W, 63-65 m.

Other material. Mexico. Off Contoy Light, Yucatán Peninsula, 73-83 m, 1(HGL).

Distribution. Southern Gulf of Mexico, from Bahía de Campeche to Contoy Light, Yucatan Peninsula.

Description. Holotype 8.2 mm in length, strong, slightly turreted, elongate-fusiform (width/ length ratio 0.39) (Figs 49-50). Protoconch paucispiral, of approximately 1.5 whorls, stout, broad; tip smooth, tinged with pale-orange; remaining protoconch white, shouldered, ornamented with, smooth, prosocline axial ribs; ribs wider than interspaces (Fig. 51); approximately 19 ribs on last whorl; demarcation between protoconch and teleoconch indicated by sudden appearance of strong spiral ornamentation. Teleoconch of 5 whorls; whorls with narrowly concave shoulders, almost straight-sided at periphery. Suture shallow. Axial sculpture of strong, rounded ribs; ribs wider than interspaces; 12 such ribs on penultimate whorl; ribs evanescing anterior to periphery of last whorl; most adapertural rib creating a moderate, rounded varix; surface of shell covered with microscopic axial threads. Spiral sculpture of first teleoconch whorl of one sharp, undulating subsutural cord, followed by a narrow, concave sulcus and two strong, rounded, peripheral cords; cords forming strong, elongated nodes when crossing axial ornamentation, followed anteriorly by a narrow, sharp, undulating, presutural cord by the third whorl; peripheral cords increasing to 3 on following apical whorls; 13 spiral cords on last whorl. Aperture elongate-ovate, 2.9 mm in length; outer lip thin, with a strong stromboid notch at anterior half; sinus at shoulder deep, rounded, calloused posteriorly, constricted at aperture. Shell pale-orange, with lighter axial and spiral ornamentation.

Discussion. The holotype and all but one of the paratypes are slightly sub-adult. Only one paratype, a rather eroded specimen, seems to be a full adult. It measures 10.1 mm and has a stronger labral varix.
The new species has been tentatively placed in the genus *Miraclathurella* because of its stout, broad-tipped, axially ribbed protoconch, its teleoconch pattern of axial ribs and strong spiral cords, its well-developed subsutural cord, deep sinus, and strong stromboid notch. However, other members of *Miraclathurella* have a multispiral protoconch with a terminal keel, a proportionately longer aperture, and a longer anterior canal. Although the fossil genus *Sedilia* Woodring, 1928 is similar, its multispiral protoconch has spiral elements, and the shells are stouter, with a shorter anterior canal. *Miraclathurella clendenini* also shares a number of characters with the Panamic genus *Maesiella* McLean, 1971; however, species placed in *Maesiella* have a protoconch

ornamentation that also includes spiral elements, and their shells have a pupoid outline with a relatively longer aperture.

The axially ribbed protoconch and the shape and sculpture of the teleoconch of the new species are similar to the southwestern Caribbean species *Darrylia kleinrosa* (Usticke, 1969) n. comb. and *Darrylia harryleei* n. sp.. However, these species lack a concave shoulder with a subsutural cord, have a well-developed denticle at the beginning of the anterior canal, and are smaller in size. Although de Jong & Coomans (1988: 116) have placed Usticke's taxon in *Miraclathurella* Woodring, 1928, the protoconch structure and other teleoconch characters of *Darrylia kleinrosa* do not conform to Woodring's definition of the genus (1928: 189).

Etymology. Named for Mr. William Clendenin, of Sarasota, Florida, an enthusiastic shell collector, a good friend, and a companion on many shelling expeditions.

Genus ***Viridrillia*** Bartsch, 1943
Type species: *Viridrillia williami* Bartsch, 1943 (by original designation)

Viridrillia aureofasciata n. sp.
Figs 52-54

Type material. Holotype ANSP 416410 length 14.9 mm, width 5.2 mm (Figs 52-54). Paratypes: 1 UF 412555 length 14.9 mm, 1 HGL, length 14.6 mm, West Florida, W. Egmont Key, Hillsborough Co., in 216 m; 1 EFG 28096, length 11.6 mm, West Florida, SW Egmont Key, Hillsborough Co., in 72-90 m.

Type locality. Off Alabama, 29°26.25'N, 87°34.47'W, 66-73 m.

Other material examined. Mexico. Bahía de Campeche, 20°51.49'N, 92°21.44'W, in 60-65 m, 1 (HGL). **USA.** West Florida, SW Egmont Key, Hillsborough Co., in 72-90 m, 2 (HGL); W Egmont Key, Hillsborough Co., in 216 m, 1 (HGL).

Distribution. Alabama, west Florida and Bahía de Campeche, Mexico, in 60- 216 m; alive off Egmont Key, Florida, dredged in 72- 90 m (EFG 28096).

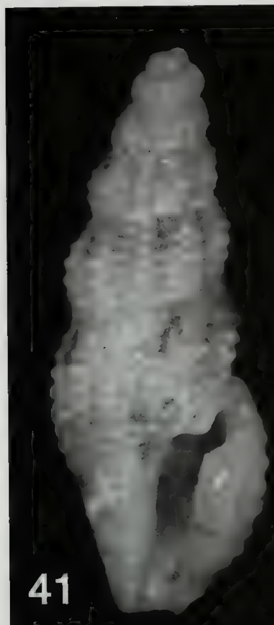
Description. Holotype 14.9 mm in length, strong, turreted (width/ length ratio 0.35) (Figs 52-53). Protoconch large, wide, paucispiral, of approximately 1.5 whorls; tip smooth, white; remainder of protoconch pale cream, ornamented at the start with strong axial cords and microscopic spiral scratches; spiral ornamentation rapidly increasing in strength, becoming as strong as axial elements on last 0.75 whorl, creating a reticulated pattern as they cross axial cords (Fig. 54); termination of protoconch indicated by last axial cord. Teleoconch of 6 convex, roundly angulated whorls. Suture incised. Axial sculpture of 8 strong, rounded, suture to suture ribs; ribs evanescing as they approach base of shell; surface of shell covered with numerous microscopic axial threads. Spiral sculpture of numerous narrow spiral cords and secondary spiral threads; cords and threads crossing over axial ribs, becoming corrugated, forming a microscopic reticulate pattern on crossing axial threads, giving a "frosted" look to surface of shell; approximately 24 spiral cords on penultimate whorl. Aperture elongate-ovate, 5.2 mm in length; anterior canal short, wide; outer lip thin, re-enforced behind by a rounded, well- defined, relatively narrow varix (Fig. 53). Sinus shallow (Fig. 53), slightly calloused posteriorly. Shell pale cream, a light-orange subsutural band starting on third whorl; a second, presutural band starting on fourth whorl, showing on last whorl below periphery of shell; color darker in axial interspaces; small, irregular blotches of same coloration showing at base of shell.

Discussion. Bartsch (1943) considered his new genus *Viridrillia* closely related to *Drillia*; however, radular studies made by Tippett (1995: 134-135; figs 20-22) have shown that, although not typical, *Viridrillia* radulae are most similar to those of Crassispirinae. I have followed Tippett in this study.

The holotype is the largest of all the specimens examined. Other than a faded, whitish coloration of most specimens, the inspected material conforms to the characters of the holotype. The operculum of the 11.6 mm specimen collected alive is dull brown, hook-shaped, with a terminal nucleus. It measures 2.8 mm in length and 1.5 mm in width.

Figures 41-54

41-45. *Darrylia harryleei* n. sp., "The Key", Oakridge, south-central Roatán Island, Bay Islands, northern Honduras, 0.2 m. Holotype ANSP 416409; length 5.9 mm, width 2.1 mm. Protoconch scale bar: 500µm. **46-48.** *Darrylia kleinrosa* (Usticke, 1969) n. comb. , off Hotel Bonaire, Bonaire Id., Netherlands Antilles, 2.5-3 m, 6.5 mm. Protoconch scale bar: 500µm (EFG 13924). **49-51.** *Miraclathurella clendenini* n. sp., Bahía de Campeche, southwestern Gulf of Mexico, 20°51.49'N, 92°21.44'W, 63-65 m. Holotype ANSP 416411; length 8.2 mm, width 3.2 mm. **52-54.** *Viridrillia aureofasciata* n. sp., off Alabama, 29°26.25'N, 87°34.47'W, 66-73 m. Holotype ANSP 416410; length 14.9 mm, width 5.2 mm.



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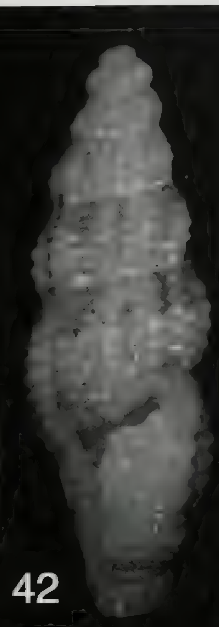

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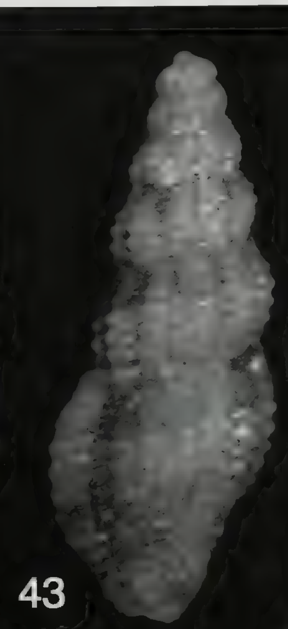

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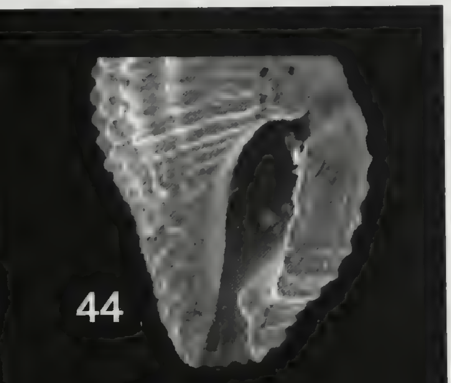

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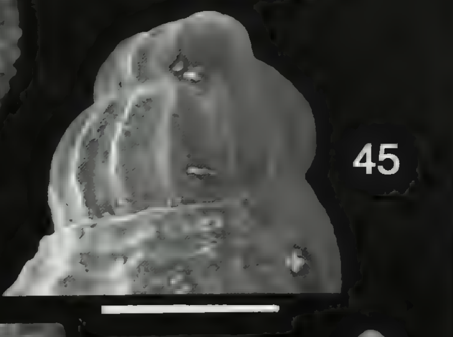

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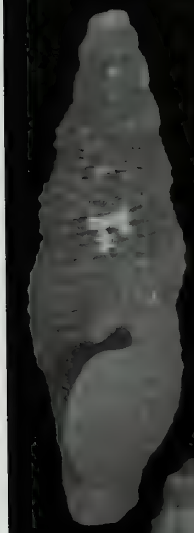

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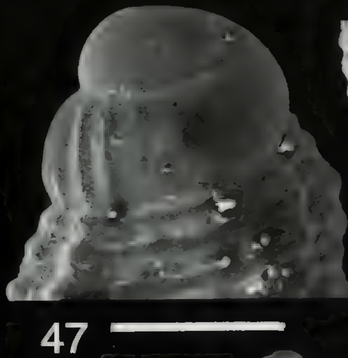

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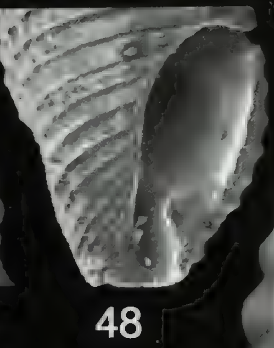

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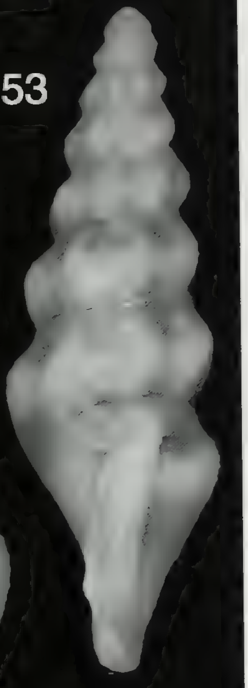

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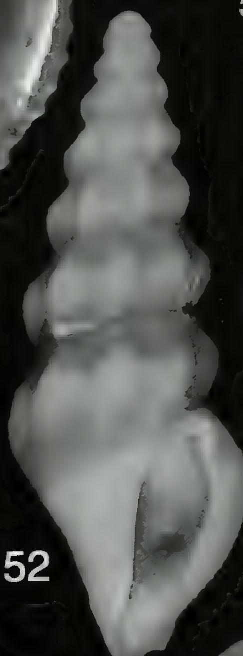

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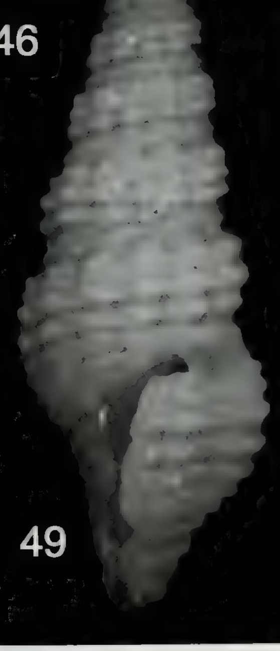

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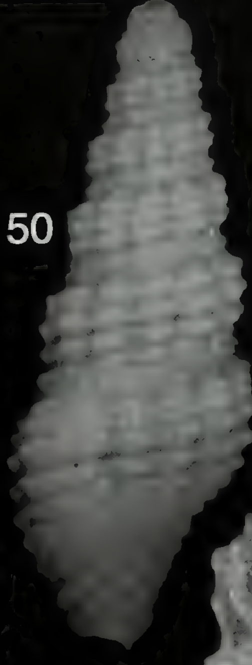

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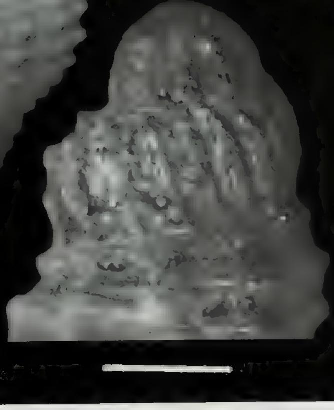

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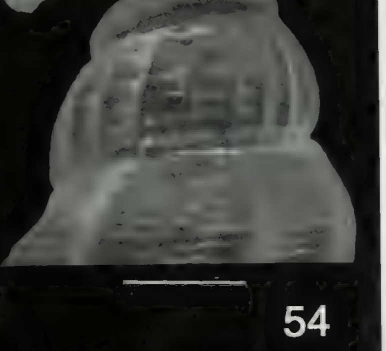

54

The new species has been assigned to *Viridrillia* based on the structure of its protoconch, which has the characters described by Bartsch (1943: 90). It is the first *Viridrillia* from the northern half of the Gulf of Mexico, and the largest in the genus. There are four western Atlantic species assigned to *Viridrillia*: *V. cervina* Bartsch, 1943, recorded from off North Carolina, has a protoconch of 2.25 whorls, grows to 10.4 mm, and is pale brown in color; *V. williami* Bartsch, 1943, recorded from off the Florida Keys but not from the Gulf of Mexico, has a protoconch of 2.3 whorls, is white with brown interspaces, and grows to only 9 mm; *Viridrillia bahamensis* Bartsch, 1943, from the Bahama Islands, has a protoconch of 2.1 whorls, is white, and grows to 10 mm; and *Viridrillia hendersoni* Bartsch, 1943, recorded from off the Florida Keys, is milky white, has a protoconch of 2.4 whorls, and grows to 10.9 mm. Moreover, there are differences in surface sculpture and profile.

Etymology. From the Latin *aureus* (adjective, meaning gold) and *fasciatus* (adjective, meaning banded), in reference to the color pattern of the species.

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New records of *Calliotropis* (Gastropoda: Chilodontidae) from central eastern Atlantic

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KEYWORDS. Gastropoda, Chilodontidae, Solariellidae, *Calliotropis*, *Solariella*, central eastern Atlantic.

ABSTRACT. A total of 10 species, most of them previously known as '*Solariella*' and living in the central eastern Atlantic, are discussed, briefly characterized and illustrated.
Solariella rudecta, *S. mogadorensis*, *S. talismani*, *S. valida*, *S. effossima*, *S. vaillanti* and *S. ambigua* are assigned to the genus *Calliotropis*.
The true identity of shells labelled '*Solariella rhina*' in various collections is established to be *Calliotropis infundibulum* (Watson, 1879).
New records are listed for *Calliotropis infundibulum*, *C. talismani*, *C. valida*, *C. vaillanti* and *C. ambigua*. The presence of the two American species *C. ottoi* and *C. globosa* in eastern Atlantic needs confirmation.
A key to central eastern Atlantic *Calliotropis* species is proposed.

RESUME. Un total de 10 espèces, la plupart connues auparavant en tant que '*Solariella*' et vivant dans l'Atlantique central oriental, sont examinées, brièvement caractérisées et illustrées.
Solariella rudecta, *S. mogadorensis*, *S. talismani*, *S. valida*, *S. effossima*, *S. vaillanti* et *S. ambigua* sont placées dans le genre *Calliotropis*.
La véritable identité de spécimens classés comme '*Solariella rhina*' dans diverses collections se révèle être en fait *Calliotropis infundibulum* (Watson, 1879).
De nouvelles stations sont enregistrées pour *Calliotropis infundibulum*, *C. talismani*, *C. valida*, *C. vaillanti* et *C. ambigua*. La présence des deux espèces américaines *Calliotropis ottoi* et *C. globosa* en Atlantique oriental demande confirmation.
Une clé de détermination des espèces de *Calliotropis* de l'Atlantique oriental central est proposée.

INTRODUCTION

Literature refers from time to time to *'Solariella'* species from subtropical and tropical eastern Atlantic, mainly off former French Western Africa (we will consider here an area from off Portugal to Angola). However, these species are in fact poorly known, probably because some of them are of small size or also because they are living at great depth. Moreover, some species are only known from the type material or even only from the original description. Finally, some of these species are not *Solariella* species at all and are indeed, among others, *Calliotropis* species.

Historical expeditions in this area are the English expeditions of the Lightning and Porcupine, conducted from 1868 to 1878, the French expeditions of Travailleur and Talisman that were led from 1880 to 1883, and the scientific campaign of the Prince of Monaco, with the Hirondelle and Princesse Alice ships, that were carried out from 1885 to 1915.

A bit later, Gruvel sampled off Mauritania and Senegal (1904, 1908) and off the African coasts, from Senegal to Congo (1909–1910).

Jeffreys (1878–1885) reported on the sampling from the Lightning and Porcupine, with the description of some *Solariella* species. Major works publishing the results of the Prince of Monaco's expeditions are the ones of Dautzenberg and H. Fischer (1896, 1906). Locard (1897) reported in another major work the expeditions of Travailleur and Talisman. Dautzenberg alone (1889, 1925, 1927) continued to report the results of the Prince of Monaco's expeditions.

These three authors described many new species in their works, with the genera used in these times. Particularly, many species were described as *Solariella* species, the genus seeming a quite generic term.

Later, Nicklès (1950) identified the known marines species of Western and Equatorial Africa. He described no new species, but gave a valuable account of the western African species that were still poorly known. Only two *Solariella* species were mentioned and none were indeed *Calliotropis*.

In the more northern part of the studied area, the MNHN carried out in 1971 the expedition Biaçores in and off Azores with J. Forest as Principal Investigator. This expedition sampled 21 littoral and 260 deep water stations. The material (in MNHN) has never been reported.

From 1976 to 1986, the Rijksmuseum van Natuurlijke Historie (NNML) led the CANCAP–project, a large programme of biogeographically oriented marine research in the south–eastern part of northern Atlantic. Seven campaigns (CANCAP–I to VII) were carried out, visiting a large area covering Azores, Madeira Archipelago, the Moroccan shelf, Canary Islands, Mauritanian coasts, Senegal and the Cape Verde Islands. Van der Land (1987) listed the stations of the whole CANCAP–project. Most resulting zoological samples are kept in the National Museum of Natural History of Leiden.

Nordsieck (1968, 1982) listed *Solariella* species of the European seas; this is a valuable check list of all available names, but its author doesn't separate *Calliotropis* from true *Solariella* species or others. Regarding non *Calliotropis* species, Rubio & Rolán (1997) moved some of them from the genus *Solariella* into the genus *Lirularia*. They based their opinion on the study of protoconch, radula and epipodial tentacles. Rolán, Hernandez and Deniz (2005) added two new species of true *Solariella* to the list. Ardovini and Cossignani (2004) published a book about West African Seashells while Rolán (2005) published recently a book about the Cape Verde Islands; these authors mentioned some known *Solariella* species of these area, without new species nor new assignment to different genera.

In the present paper, the authors focus on available material labelled as '*Solariella*' and coming from central eastern Atlantic, mainly western African areas, whose careful study shows that these species are obviously not *Solariella* but *Calliotropis*. The results of these investigations are reported here with illustrations, when possible, of types or representative specimens.

Abbreviations

Repositories

MNHN: Muséum national d'Histoire naturelle, Paris, France – repository for material of TRAVAILLEUR 1882, TALISMAN 1883 and Mission Biaçores campaigns.
MOM: Musée Océanographique de Monaco, Monaco – repository for material of PRINCESSE–ALICE II campaign.
BMNH: Natural History Museum, London, England.
NNML: Nationaal Natuurhistorisch Museum Leiden, The Netherlands – repository for material of CANCAP–II & III campaigns.
USNM: National Museum of National History, Smithsonian Institution, Washington, U.S.A.
ZSM: Zoologische Staatssammlung, München, Germany – repository for material of METEOR 36 campaign.

Other abbreviations

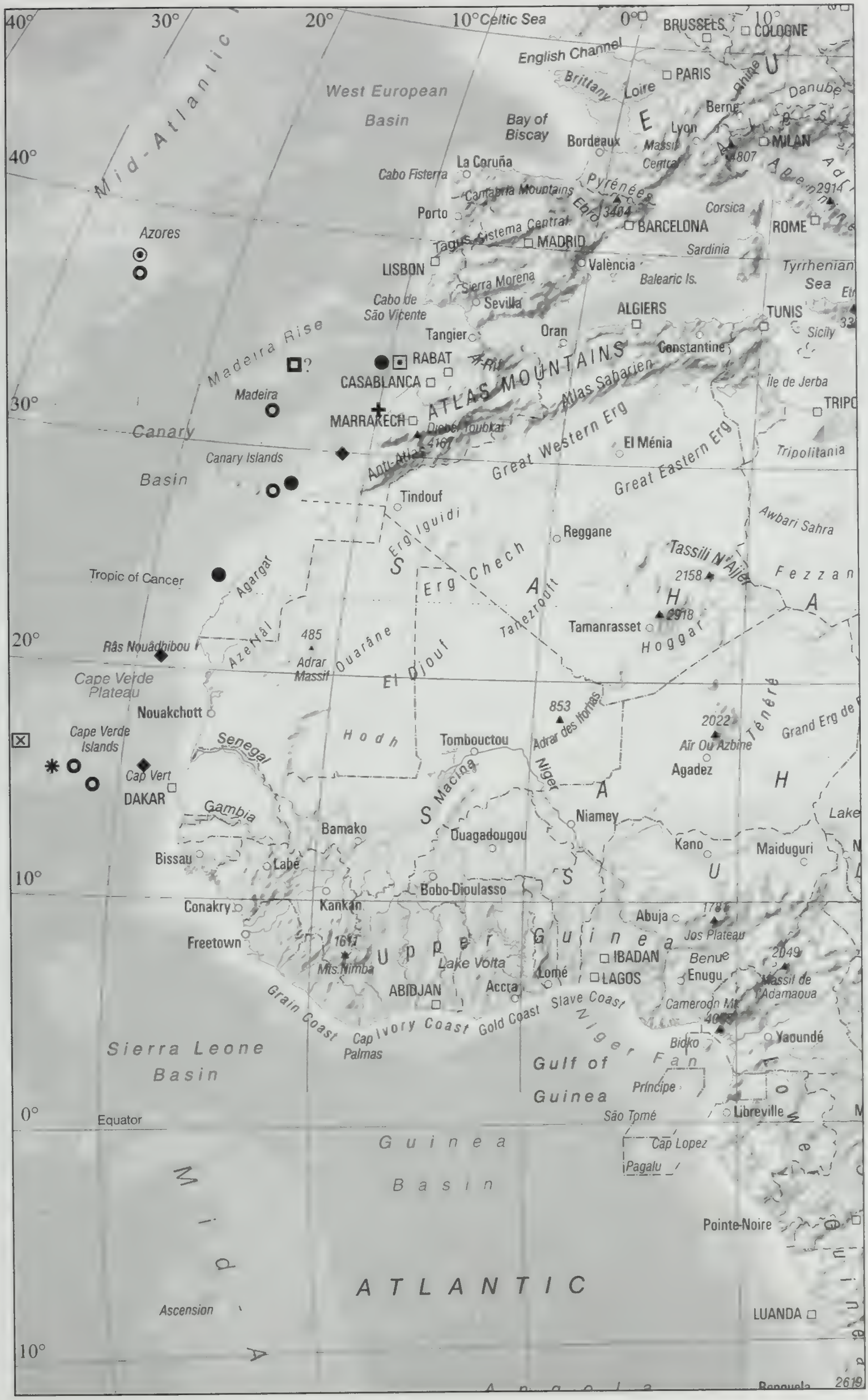
H: height
W: width
P1, P2, P3, ...: primary cords (P1 is the most adapical)
S1, S2, S3, ...: secondary cords (S1 is the most adapical)
stn: station
lv: live–taken specimens present in sample
dd: no live–taken specimens present in sample
sub: subadult specimen
juv: juvenile specimen
col: private collection

Remark about the distribution ranges

Regarding the extension of the distribution of known species, the range is taken from the internal intervals of the two extremes values.

KEY TO SPECIES

It is easy to distinguish, among the studied species, those that belong to the genus *Calliotropis* Seguenza, 1903, although it is not really easy to give it an operational straightforward definition, because there are in this genus many variations regarding the height of the spire and the presence or absence of umbilicus. But, considering the type species, one can characterize *Calliotropis* by a nacreous layer apparent on the whole surface, a rather small number of granular or nodular spiral cords on the whorls (that is, 3 or 4 primary cords, sometimes up to the same number of secondary cords), a small number of similar cords on the base and often an umbilicus without spiral cord or with up to 3 or 4 spiral cords inside.
We give here a keys system to help to distinguish the Atlantic species studied in this paper (excluding the doubtful *C. globosa*). Criteria used are mainly the shape of the shell and the number (sometimes also the strength or the weakness) of cords on the last whorl, on the base and inside the umbilicus.


40°
30°
20°
10°
0°
10°
Celtic Sea
English Channel
BRUSSELS
COLOGNE
PARIS
Brittany
Loire
Rhine
Danube
Berne
West European Basin
Bay of Biscay
Bordeaux
Massif Central
Lyon
MILAN
4807
Mid-Atlantic
La Coruña
Cabo Fisterra
Cantabria Mountains
Pyrénées
3404
Ebro
Porto
Tagus
Sistema Central
MADRID
BARCELONA
Corsica
ROME
2914
Sardinia
Azores
LISBON
València
Balearic Is.
Tyrrhenian Sea
Sierra Morena
Sevilla
Cabo de São Vicente
ALGIERS
TUNIS
Sicily
Tangier
Oran
Constantine
Madeira Rise
RABAT
CASABLANCA
Rif
ATLAS MOUNTAINS
Atlas Saharien
Île de Jerba
Madeira
MARRAKECH
Djebel Toubkal
4167
TRIPOLI
Canary Basin
Anti-Atlas
Great Western Erg
El Ménia
Tripolitania
Canary Islands
Great Eastern Erg
Tindouf
Erg Iguidi
Awbari Sahra
Reggane
Tassili N'Ajjer
Tropic of Cancer
Agargar
Erg Chech
2158
Fezzan
Tanezrouft
Tamanrasset
2918
Hoggar
SAHARA
Râs Nouâdhibou
Azeffâl
485
Adrar Massif
Ouarâne
El Djouf
Cape Verde Plateau
Nouakchott
853
2022
Cape Verde Islands
Senegal
Hodh
Tombouctou
Adrar des Iforhas
Aïr Ou Azbine
Ténéré
Grand Erg de Bilma
Cap Vert
DAKAR
Macina
Niger
Agadez
Gambia
Niamey
Bamako
Ouagadougou
Kano
Maiduguri
Lake Chad
Bissau
Labé
Bobo-Dioulasso
Conakry
Kankan
Abuja
1781
Jos Plateau
Freetown
1614
Mts Nimba
Upper Guinea
Lake Volta
IBADAN
Benue
2049
Lomé
LAGOS
Enugu
Massif de l'Adamaoua
ABIDJAN
Accra
Slave Coast
Grain Coast
Ivory Coast
Gold Coast
Cameroon Mt
4095
Cap Palmas
Bioko
Yaoundé
Sierra Leone Basin
Niger Fan
Gulf of Guinea
Príncipe
Equator
São Tomé
Libreville
Cap Lopez
Pagalu
Guinea Basin
Pointe-Noire
Mid-Atlantic
ATLANTIC
Ascension
LUANDA
Lower Guinea
Angola
Benguela
2619

Map 1 : Records of cited *Calliotropis* species – ◆ : *C. infundibulum*; ⊡ : *C. rudecta*; ✚ : *C. mogadorensis*; ● : *C. talismani*; ✱ : *C. valida*; ☒ : *C. effossima*; ⊙ : *C. vaillanti*; **○** : *C. ambigua*; ◘ : *C. ottoi*.

Key to *Calliotropis* species of eastern Atlantic area
(numbers of spiral cords refers to the last whorl of teleoconch)

1. spire high elevated 2
– spire moderately high or weakly depressed 4
2. 4 spiral cords, cords similar in size, 1 spiral cord inside umbilicus .... *C. rudecta* [p.25]
– 3 spiral cords 3
3. nodules of P2 stronger than nodules of other cords .... *C. ottoi* [p.20]
spire a bit more elevated, nodules of P1 the strongest .... *C. infundibulum* [p.24]
4. shape slightly coloeconoidal, P2 the strongest, 1 cord inside umbilicus .... *C. mogadorensis* [p.25]
shape conical or cyrtoconoidal 5
5. distance between P1–P2 two times greater than distance between P2–P3 .... *C. talismani* [p.26]
P1, P2 et P3 more or less evenly distributed 6
6. spire rather depressed 7
– spire moderately high 8
7. nodules of cords more or less similar in size .... *C. valida* [p.26]
– size of nodules decreasing from P1 to P3 .... *C. effossima* [p.27]
8. nodules of P1 sharp, rather small, sometimes 1 weak cord inside umbilicus .... *C. vaillanti* [p.28]
– nodules of P1 blunt, rather strong, less numerous, 2 or 3 umbilical cords .... *C. ambigua* [p.28]

SYSTEMATICS

We follow here the classification of Bouchet & Rocroi (2005), where Calliotropini, earlier treated as a tribe of Trochidae (Hickman & McLean, 1990), are now ranked as a subfamily of family Chilodontidae.

Superorder **VETIGASTROPODA** Salvini–Plawen, 1980
Superfamily **SEGUENZIOIDEA** Verrill, 1884
Family **CHILODONTIDAE** Wenz, 1938
Subfamily **CALLIOTROPINAE** Hickman & McLean, 1990
Genus ***Calliotropis*** Seguenza, 1903
Type species: *Trochus ottoi* Philippi, 1844 (by original designation) – Pliocene–Pleistocene, Italy.

Calliotropis ottoi (Philippi, 1844)
Figs 29-33

Trochus ottoi Philippi, 1844: 227, pl.28, fig. 9.
Basilissa ottoi – Martens & Thiele, 1904: 126, pl.IV, fig. 18.
Lischkeia ottoi – Abbott, 1974: 39, fig. 265.
Calliotropis ottoi – Warén, 1991: 56, fig. 1B.
Calliotropis (Calliotropis) ottoi – Quinn, 1979: 7, figs 5–6.
Lischkeia (Calliotropis) ottoi – Nordsieck, 1982: 15, pl.7, fig. 10.100.
Lischkeia ottoi – Abbott, 1991: 37.

Type material. No types located (lost ?).

Type locality. Mediterranean Sea, Pleistocene.

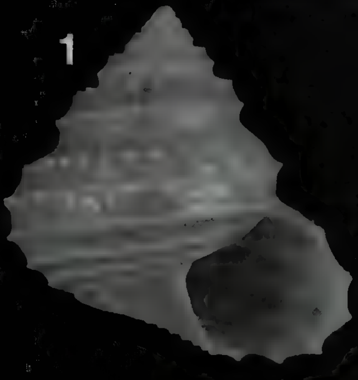
Material examined. Iceland. Off Stykkisholmur, Breidafjodur, 45–60 m, coll. F. Swinnen, 1 dd. – Off Hornafjordur, 60–70 m, coll. F. Swinnen, 2 lv sub. – **U.S.A.** Off Jamestown, Rhode Island, coll. F. Swinnen, 1 lv.

Distribution. North–western Atlantic (from Nova Scotia to off north Carolina), north–eastern Atlantic (from Iceland and Faeroe Is. to Azores and Madeira), Indonesia (Sumatra – doubtful), 85–1000 m, Sicily (Fossil).
Warén (1976) pointed out that the bathymetric ranges of the distribution are uncertain because authors made confusions with other species (for example, *C. regalis* (Verrill & Smith, 1880)). We never recorded this species in Azores nor in Madeira, where however it should be expected as a survivor of the deep–water Plio–Pleistocene fauna of the Sicily.

Plate 1. Figures 1–12. Scale bars: 5 mm

1-8. *Calliotropis "rhina"* (Watson, 1886) specimens that are indeed *C. infundibulum* (Watson, 1879).
1-2. MNHN, Atlantic Morocco, 2212 m [TALISMAN 1883, stn DR40], 17.2 x 16.0 mm; **3-4.** MNHN, Cape Verde Is., 3200 m [TALISMAN 1883, stn DR101], 23.5 x 20.3 mm; **5-6.** ZSM (19960312), off Mauritania, 2110 m [Meteor 36, stn 100], 15.2 x 13.9 mm; **7-8.** var. major, MNHN, Atlantic Morocco, 2210 m [TALISMAN 1883, stn DR38], 20.8 x 16.9 mm.
9-12. *Solariella rhina* (Watson, 1885), syntypes BMNH, Azores - photos taken by BMNH.
9-10. BMNH (1887.2.9.302–6), 8.5 x 7.5 mm; **11-12.** BMNH (1887.2.9.307), 8.2 x 8.5 mm.

1



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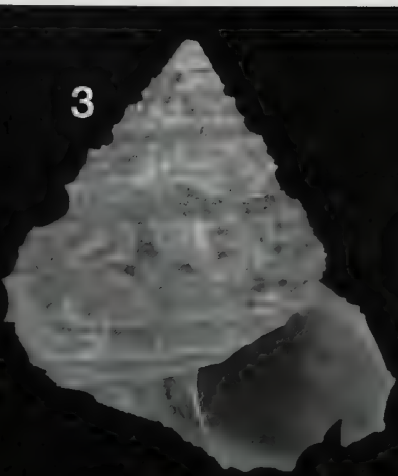

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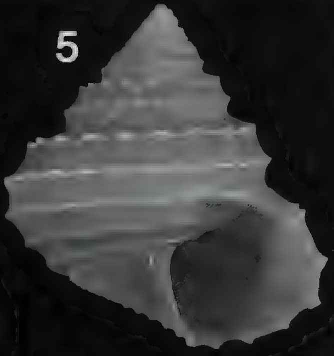

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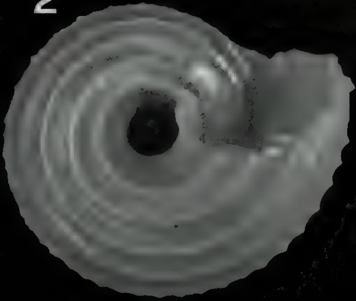

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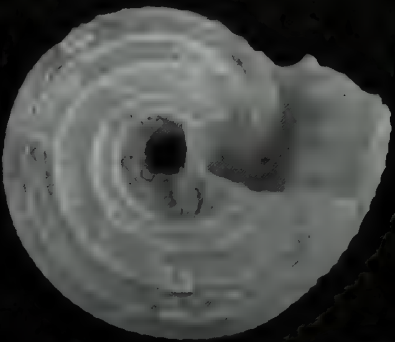

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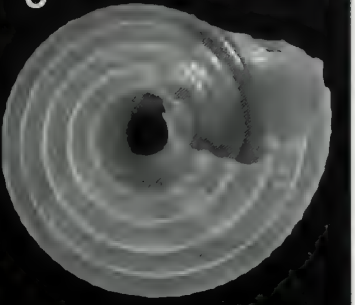

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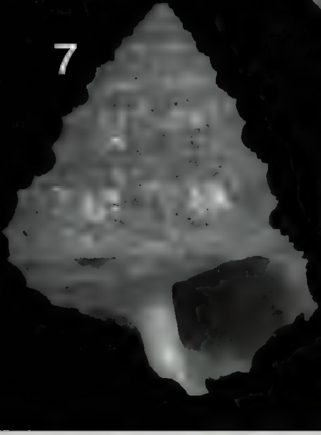

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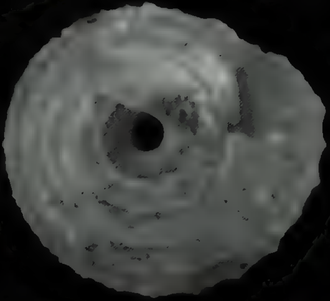

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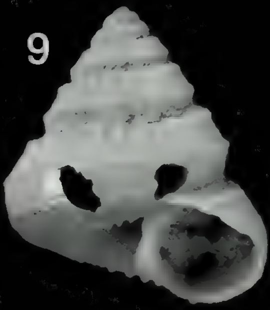

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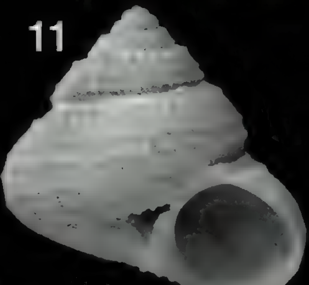

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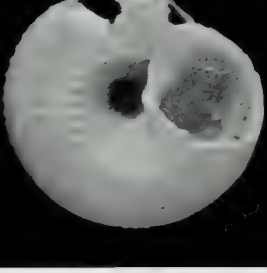

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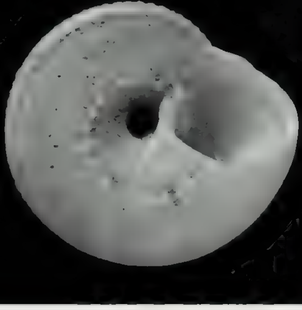


Remarks. The main characteristics of this species are :

- height up to 10 mm, width up to 15 mm;
- a high spire, an almost conical shape, with up to 6 whorls;
- 2 granular cords P1 and P2 on spire whorls and an additional peripheral, granular spiral cord P3 on last whorl; P2 the strongest; axial ribs obsolete on last whorls;
- 4–6 granular spiral cords on the base, the innermost cord with strong nodules; interspace between cords two times as broad as cords;
- a rather narrow umbilicus with one granular spiral cord inside;
- a whitish silvery colour.

See Quinn (1979, figs 5–6) for another illustration.

"Calliotropis" rhina (Watson, 1885)

Figs 9-12

Trochus (Margarita) lima Watson, 1879: 703 (*non* Philippi, 1844).
Trochus (Margarita) rhina Watson, 1885: 80–81, pl.V, fig. 1 (*nom. nov.* for *T. (M.) lima* Watson, 1879).
Solariella rhina – Locard, 1897: 23, pl.XXII, fig. 25–28.
Calliotropis (Solaricida) rhina – Quinn, 1979: 13, fig. 27–28.
Solariella rhina – Nordsieck, 1982: 16, fig. 302.

Type material. 14 syntypes BMNH (1887.2.9.302–6, 1887.2.9.307, 1887.2.9.308–310, 18589.11.11.4–6).

Type locality. Azores, 1829 m. Quinn (1979) noted that Watson selected no holotype and used as type locality the one of the largest BMNH syntype (Challenger stn 78); we do the same here.

Distribution. Azores, 800–1800 m (Locard); Atlantic Morocco, 2075–2212 m; off Senegal, 3200 m, and off Mauritania, 2110–2843 m.

Remarks. Quinn (1979) already pointed out the confusion surrounding Atlantic *Calliotropis* species as *C. aeglees* (Watson, 1879) or *C. rhina* (Watson, 1885). While its arguments about *C. aeglees* are certainly pertinent, it is clear that he never studied the types of *C. rhina* – "the syntypes are probably in the British Museum (Natural History)". They are indeed in the BMNH (14 syntypes), but we were very surprised to note that these shells, that are probably true *Solariella*, are very different from all the studied specimens coming mainly from MNHN or ZSM and labelled "*Solariella rhina* (Watson, 1885)".

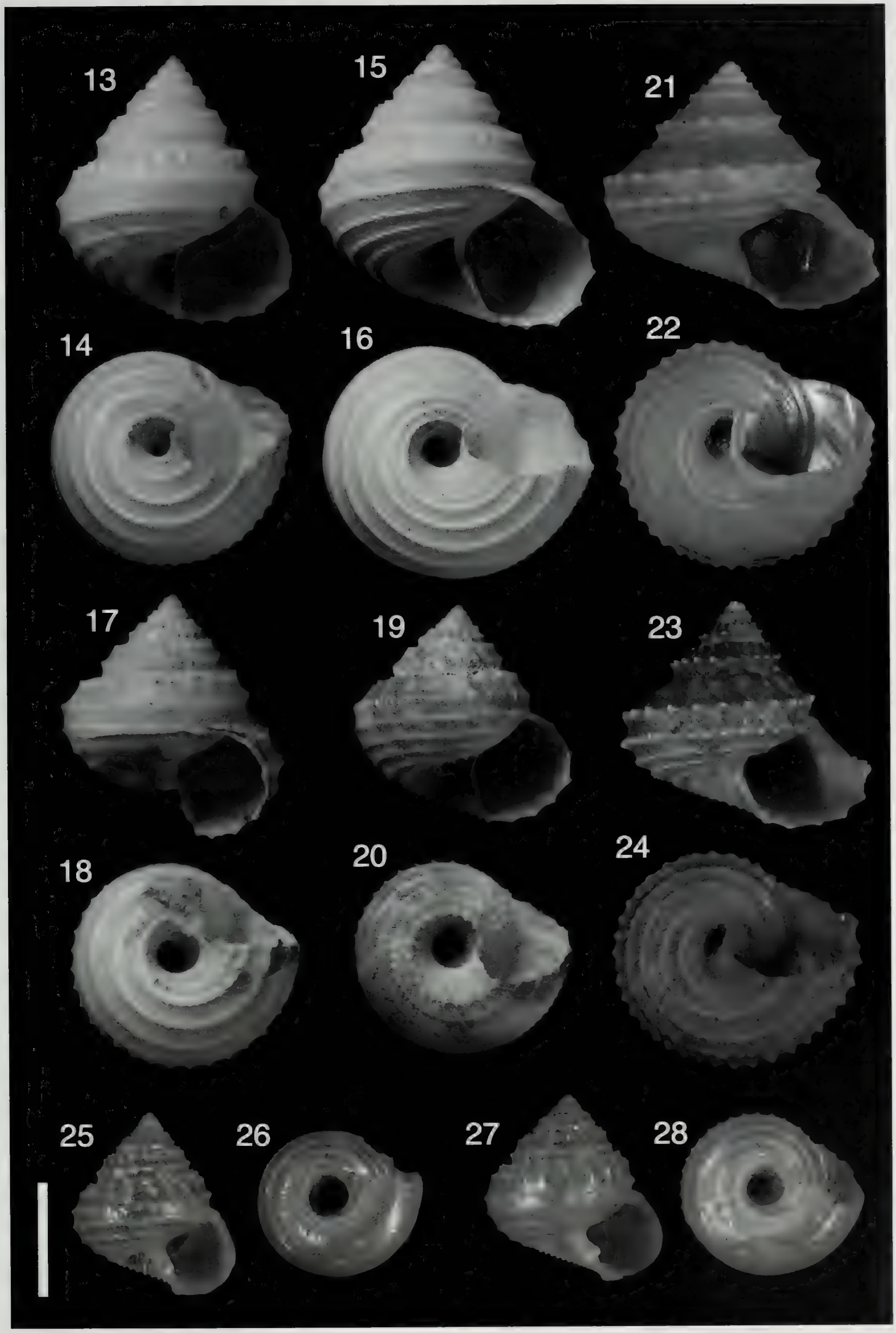
We also noticed that much earlier, Locard (1897) mentioned *Solariella rhina* and gave an illustration of the form *major*; but he used only the illustrations of the Challenger report (Watson, 1886), of rather poor quality, to establish that the shells he had before him were *S. rhina*.

Because it is yet clear that the MNHN and ZSM shells labelled "*Solariella rhina*" are definitively not *S. rhina* and because they differ from all other known central eastern Atlantic *Calliotropis*, we looked for similar species from the central western Atlantic. The next table (Table 1) lists these species.

C. diomediae (Verril, 1880), of which the only illustration was found in the cards of Kaicher (1987), seems to match rather well with our name–lacking shells, except that it has a higher ratio H/W and much more thicker, more spaced and less numerous beads on the two most adapical spiral cords, these two cords being of the same size. In fact, it appeared quickly that all the misidentified specimens were indeed *C. infundibulum* (Watson, 1879).

Figures 13-28. Scale bar: 5 mm.

13-20. *C. infundibulum* (Watson, 1879), syntypes BMNH, Prince Edward Island – photos taken by Phil Hurst (BMNH).
13-14. BMNH (1887.2.9.328–9), 14.8 x 12.5 mm; **15-16.** BMNH (1887.2.9.328–9), 16.0 x 14.9 mm; 17-18. BMNH (1887.2.9.325–7), 12.0 x 11.9 mm; **19-20.** BMNH(1887.2.9.325–7), 10.9 x 10.7 mm.
21-24. *C. mogadorensis* (Locard, 1897).
21-22. Syntype MNHN, Atlantic Morocco, 912 m [TALISMAN 1883, stn DR36], 13.7 x 15.3 mm; **23-24.** MNHN, Atlantic Morocco, 1900 m [TRAVAILLEUR 1882: stn DR40], 12.5 x 13.7 mm.
25-28. *Calliotropis? globosa* Quinn, 1991, said to be from Madeira, south–east of Porto Santo, 790–840 m, B.Van Heugten coll.. **25-26.** 8.8 x 7.7 mm; **27-28.** 9.1 x 8.5 mm.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	spire	largest dimensions (mm)	spiral cords on whorls	spiral cords on base	umbilicus
C. regalis (Verrill & Smith, 1880)	moderately elevated, conical	14 x 15	3, subsutural cord thinner	5–6	wide, with 1 or 2 spiral cords within
C. aeglees (Watson, 1879)	moderately elevated, conical	7 x 7.5	3	3	wide
C. calatha (Dall, 1927)	variable : from moderately high to moderately depressed	10 x 13	2–3	3–4	wide, with a few thin spiral cords
C. lissocona (Dall, 1881)	elevated, conical	6 x 5	3, subsutural cord thinner	3	wide
C. actinophora (Dall, 1890)	moderately depressed	9 x 10	4, subsutural cord thinner	4	wide
C. diomediae (Verril, 1880)	elevated	23 x 18	3	4	moderately wide
C. infundibulum (Watson, 1879)	rather elevated	20 x 20	3, subsutural cord thicker	4	wide without cord inside

Table 1. *Calliotropis* from central western Atlantic : general features following literature

Calliotropis infundibulum (Watson, 1879)

Figs 1–8, 13-20

Trochus infundibulum Watson, 1879: 707–708.
Trochus (Margarita) infundibulum – Watson, 1885: 84–85, pl.V, fig. 5.
Solariella infundibulum – Dall, 1889: 380–381.
Solariella infundibulum – Dall, 1890: 349–352.
Solariella infundibulum – Abbott, 1974: 41, fig. 287.
Solariella infundibulum – Cernohorsky, 1977: 105, fig. 1.
Calliotropis infundibulum – Marshall, 1979: 531, figs 4E–G, 9C–F.
Calliotropis infundibulum – Kaicher, 1990: 5690.
Calliotropis infundibulum – Sasaki, 2000: 59, pl. 29, fig. 25.
Calliotropis infundibulum – Vilvens, 2004: figs 27–28.
Calliotropis infundibulum – Vilvens, 2007: figs 84–85.

Type material. 5 syntypes, BMNH (1887.2.9.325–7, 1887.2.9.328–9).

Type locality. Prince Edward Island (Indian–Atlantic Ridge area), 46°46'S, 45°31'E, 2514 m.

Material examined. Atlantic Morocco. TALISMAN 1883: stn DR38, 30°09'N, 11°41'W, 2210 m, 1 dd. – Stn DR40, 30°03'N, 11°42'W, 2212 m, 1 lv, 2 dd, 2 dd sub. – Stn DR42, 29°58'N, 11°41'W, 2104 m, 2 lv, 2 dd, 1 dd sub. – Stn DR43, 29°52'N, 11°44'W, 2075 m, 1 lv, 3 dd, 1 dd sub. – **Senegal (off Cap Vert).** TALISMAN 1883: stn DR101, 16°38'N, 18°24'W, 3200 m, 1 lv, 1 dd. – **Off Mauritania.** METEOR 36: stn 99, 21°36.2'N, 18°40.6'W, 2843 m, 2 lv. – Stn 100, 21°27.1'N, 18°16.1'W, 2110 m, 2 lv. – **Madeira.** South–east of Porto Santo, 32°26'N, 15°11'W, 790–840 m, F. Swinnen coll., 1 dd.

Distribution. Western Atlantic (from northern America to Brazil), 230–3259 m (Clarke, 1962), eastern Atlantic (Azores, 800–1800 m (Locard, 1898); Atlantic Morocco, 2075–2212 m; off Senegal, 3200 m, and off Mauritania, 2110–2843 m), Indian–Atlantic Ridge, 1965–2514 m (Watson, 1879); South Africa, 2750 m (Martens, 1903); Japan, 2000–2150 m (Higo et al., 1999); south–western Pacific, 2040–2315 m; New Zealand, 2080–2515 m (Marshall, 1979).

Remarks. This is an extension of this widespread species, known from western Atlantic to western Indo–Pacific.

The main characteristics of this *Calliotropis* species are :
- height up to 23.5 mm, width up to 20.3 mm;
- a high spire, an almost conical shape, with up to 7.5 whorls;
- 2 granular cords P1 and P2 on spire whorls and an additional peripheral, granular spiral cord P3 clearly visible on last whorl, the granules of the adapical cord being the strongest; axial ribs still visible near the granules;
- 4 thin granular spiral cords on the base, the innermost cord with strong nodules; interspace between cords three times as broad as cords;
- a broad umbilicus without spiral cord inside;
- a whitish silvery colour.

On some specimens, P1 may divide in two cords, giving three cords on last spire whorls instead of two (this is the variety *major* of authors for "*Solariella rhina*").

The three examined syntypes registered as 1887.2.9.325–7 have a more depressed spire and a spiral cord P2 with thicker, less numerous, more spaced beads than the two syntypes registered as 1887.2.9.328–9. The labelled "*S. rhina*" specimens are intermediate between the two kinds of syntypes, with a rather elevated spire (as 1887.2.9.328–9 syntypes) and thick, isolated beads on P2 (as 1887.2.9.325–7 syntypes).

Calliotropis rudecta **(Locard, 1897)**
Figs 48–49

Solariella rudecta Locard, 1897: 33–34, pl.I, figs 17–19.
Solariella rudecta – Nordsieck, 1982: 16, fig. 303.

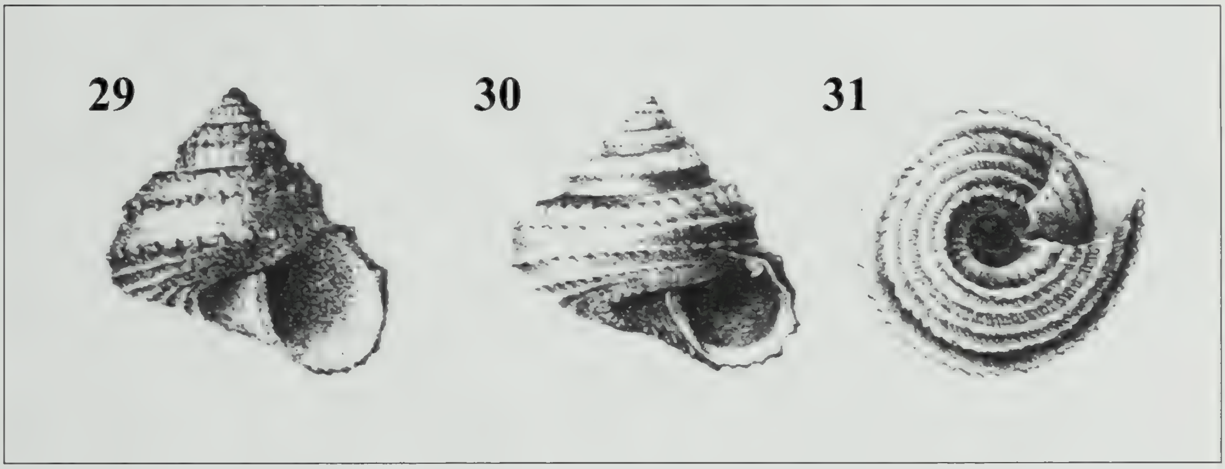
Type material. Holotype MNHN.

Type locality. Off western Morocco, 1900 m.

Material examined. Off Morocco. TRAVAILLEUR 1882: stn DR40, 33°09'N, 09°38'W, 1900 m, 1 dd (holotype).

Distribution. Only known from the type locality.

Remarks. The main characteristics of this species are :
- height 5 mm, width 3.5 mm;
- a high spire, a slightly coeloconoidal shape, with 5.5 whorls;
- 3 primary granular cords on spire whorls, 2 secondary cords S1 and S2 on last whorls and an additional peripheral, granular spiral cord P4 on last whorl; granules of cords sharp and similar in size; axial ribs visible, connecting nodules;
- 3 thin granular spiral cords on the base; interspace between cords two times as broad as cords;
- a deep, rather broad umbilicus with a spiral cord within;
- a beige colour.



Figures 29-31. *Calliotropis ottoi* (Philippi, 1844).

29. Illustration from the original description from Philippi (1844); **30-31.** Illustrations from Martens & Thiele (1904)

Calliotropis mogadorensis (Locard, 1897)
Figs 21–24

Solariella mogadorensis Locard, 1897: 24–25, pl.I, fig. 1–4.
Solariella mogadorensis – Nordsieck, 1982: 16, fig. 307.

Type material. 10 syntypes MNHN.

Type locality. Off western Morocco, 1900 m.

Material examined. Off Morocco. TRAVAILLEUR 1882: stn DR40, 33°09'N, 09°38'W, 1900 m, 1 dd (syntype MNHN). – TALISMAN 1883: stn DR34, 32°27'N, 09°55'W, 1123 m, 1 lv, 1 dd (syntypes MNHN). – Stn DR36, 31°34'N, 10°21'W, 912 m, 1 lv, 2 dd (syntypes MNHN). – Stn DR37, 31°31'N, 10°27'W, 1050 m, 4 dd (syntypes).

Distribution. Only known from type locality

Remarks. The main characteristics of this species are :
- height up to 13.5 mm, width up to 15 mm;
- a moderately high spire, a slightly coloeconoidal shape, with up to 7 whorls;
- 3 primary granular cords on spire whorls; P2 the strongest with sharp spaced nodules, P1 almost obsolete on last whorls, P3 with more crowed, smaller nodules than P2;

- 4 or 5 thin granular spiral cords on the base; interspace between cords about 1.5 times as broad as cords;
- a deep, broad umbilicus with a spiral cord inside;
- a silvery white colour.

Calliotropis talismani (Locard, 1897)

Figs 44–47

Solariella talismani Locard, 1897: 25–26, pl. I, figs 5-8.

Type material. 2 syntypes MNHN.

Type locality. Off western Morocco, 1350 m.

Material examined. Atlantic Morocco. TALISMAN 1883: stn DR33, 33°31'N, 09°48'W, 1350 m, 1 dd (syntype MNHN). – CANCAP–II: stn 2.039, 28°02'N, 13°26'W, 1010 m, 1 dd. – **Western Sahara.** CANCAP–III: stn 3.107, 24°17'N, 16°49'W, 1000–1100 m, 1 dd. – **Canary Is.** CANCAP–II: stn 2.079, 28°01'N, 14°26'W, 870 m, 1 dd.

Distribution. Atlantic Morocco, 840–1350 m (Locard, 1898), western Sahara, 1000–1100 m, and Canary Is., 870 m.

Remarks. The main characteristics of this species are :
- height up to 8 mm, width up to 9 mm;
- a rather high spire, a more or less conical shape, with up to 5.5 whorls;
- 2 primary granular cords on spire whorls; nodules of P1 the strongest, spaced, nodules of P2 more crowed, smaller than nodules of P1; granular spiral cord P3 on last whorl, with small granules; distance between P1 and P2 1.5 to 2 times greater than distance between P2 and P3; axial sculpture obsolete;
- 4 thin granular spiral cords on the base; interspace between cords about 2 times as broad as cords;
- a deep, rather broad umbilicus without clearly visible spiral cord within;
- a silvery white colour.

Calliotropis valida (Dautzenberg & H. Fischer, 1896)

Figs 50–53

Solariella valida Dautzenberg & H. Fischer, 1896: 8–9, pl.III, figs 22–27.
Solariella valida – Dautzenberg & H.Fischer, 1906: 57–58, pl.III, figs22–27.
Solariella valida – Nordsieck, 1982: 16, fig 306.
Solariella valida – Rolán, 2005: 47, figs 107–108.

Type material. 63 syntypes MOM (INV-19940, INV-19941, INV-21029, INV-1725).

Type locality. Cape Verde Islands, 1311 m.

Material examined. Cape Verde Islands. PRINCESSE–ALICE II: stn 1193, 15°17'N, 23°01'45"W, 1311 m, 63 lv (syntypes MOM).

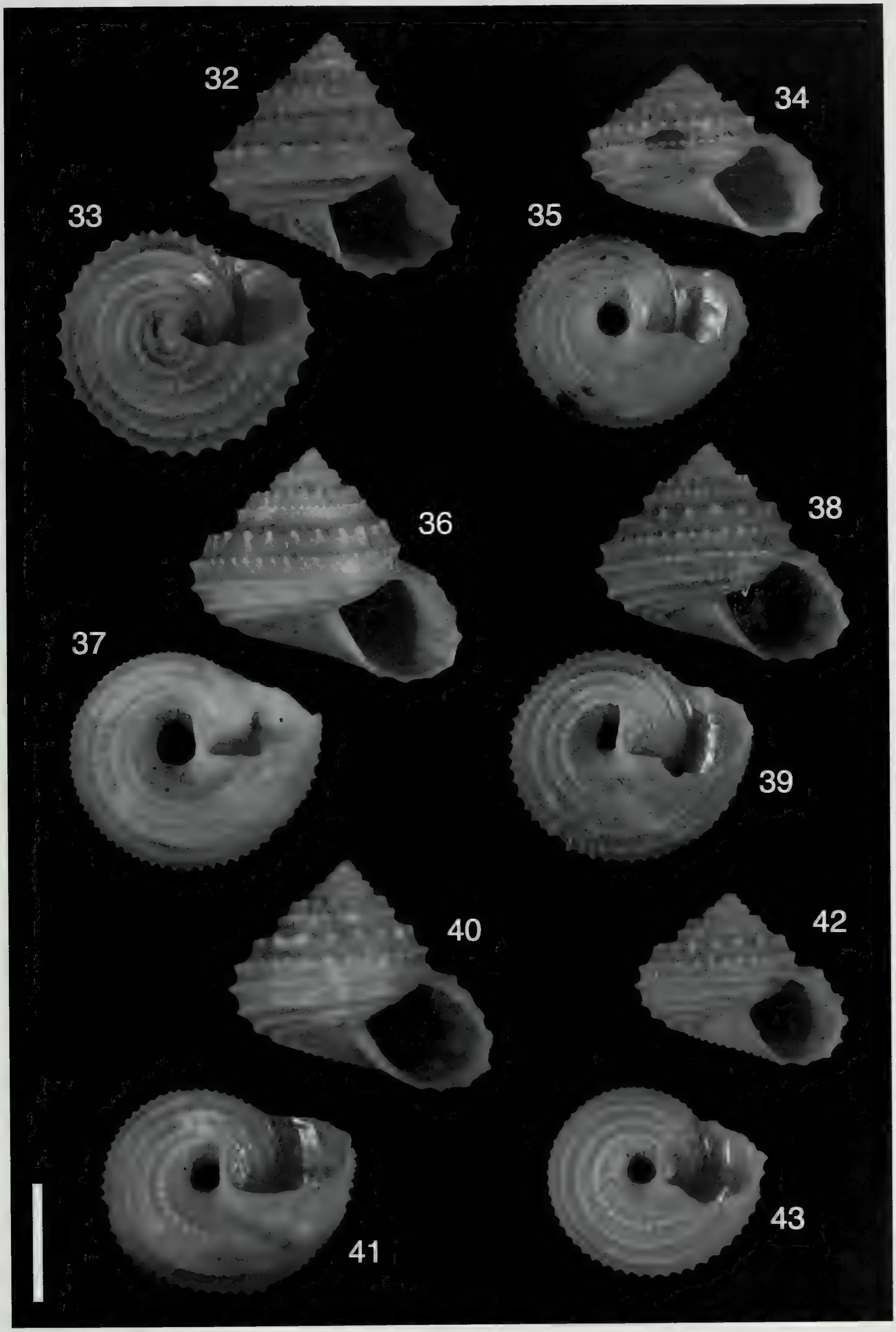
Distribution. Off Morocco (Nordsieck, 1982) and Cape Verde Islands, 1311 m.

Remarks. The main characteristics of this species are :
- height up to 15 mm, width up to 16 mm;
- a moderately high spire, a slightly cyrtoconoidal shape, with up to 6.5 whorls;
- 3 primary granular cords on spire whorls, similar in size; nodules of P1 and P2 strong, bluntly sharp, widely spaced; nodules of P3 a bit smaller, not sharp; S1 may be present at fifth whorl; axial sculpture obsolete as early as second whorl;
- 4 (sometimes 5) granular spiral cords on the base; interspace between cords about 1.5 to 2 times as broad as cords;
- a deep, rather broad umbilicus without spiral cord within;
- a silvery beige colour.

The numbers of station used here are the general ones, that is an incremental numbering across all the expeditions of the Monaco's Prince. The scientists of these campaigns used, before publication, a new numbering for each campaign (these numbers are used on labels of specimens), but they transformed for their paper the campaign numbers in general numbers, valid whatever the campaign they belonged to (Bruni, personal communication).

Figures 32-43. Scale bar: 5 mm.

32-33. *Calliotropis ottoi* (Philippi, 1844), Iceland, coll. F. Swinnen, 13.9 x 14.4 mm.
34-35. *C. effossima*(Locard, 1897), syntype MNHN, Cape Verde Islands, 550–760 m [TALISMAN 1883, stn DR113], 7.6 x 10.7 m.
36-39. *Calliotropis vaillanti* (P.Fischer, 1882), MNHN, Azores.
  36-37. 1590–1665 m [Mission Biaçores, stn 179], 10.6 x 12.2 mm. **38-39.** 1200–1240 m [Mission Biaçores, stn 64], 9.8 x 11.0 mm.
40-43. *C. ambigua* (Dautzenberg & Fischer, 1896).
  40-41. Syntype MOM (INV-19937), Azores, 1385 m [Princesse Alice, stn 46 (=553?)], 9.7 x 11.4 mm.
  42-43. NNML, Cape Verde, 950–1040 m [CANCAP VI, stn 6–065], 6.7 x 8.4 mm.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Calliotropis effossima (Locard, 1897)
Figs 34–35

Solariella effossima Locard, 1897: 27–29, pl.I, figs 9–12.
Solariella effossima – Nordsieck, 1982: 16, fig. 309.
Solariella effossima – Rolán, 2005: 47, figs 109–110.

Type material. Holotype MNHN.

Type locality. Cape Verde Islands, 493–618 m.

Material examined. Cape Verde Islands. TALISMAN 1883: stn DR113A, 16°52'N, 25°11'W, 618 m, 1 dd (holotype).

Distribution. Off Morocco, 1900 m (Locard, 1898) and Cape Verde Islands, 618 m.

Remarks. The main characteristics of this species are :
- height up to 7.5 mm, width up to 10.5 mm;
- a moderately depressed spire, a slightly cyrtoconoidal shape, with up to 5.5 whorls;
- 2 primary granular cords on spire whorls; P1 the strongest with big, sharp, spaced nodules; P2 weaker than P1; P3 the weakest with more crowed, smaller nodules than P2;
- 4 thin granular spiral cords on the base, the innermost stronger; interspace between cords about 2 to 2.5 times as broad as cords;
- a deep, broad umbilicus with two or three thin spiral cords within;
- a light brownish colour.

Calliotropis vaillanti (P. Fischer, 1882)
Figs 36–39

Trochus vaillanti P. Fischer, 1882: 50.
Solariella vaillanti – Dautzenberg & H. Fischer, 1894: 477, pl. XX, fig. 12.
Solariella vaillanti – Locard, 1897: 27, pl. II, fig. 5–8.
Solariella vaillanti – Dautzenberg, 1927: 188, pl. V, figs 33–34;
Calliotropis vaillanti – Quinn, 1979: 9, figs 9–10.
Lischkeia (Calliotropis) ottoi vaillanti – Nordsieck, 1968: 19.
Solariella vaillanti – Nordsieck, 1982: 16, fig. 308.
Solariella vaillanti – Rolán, 2005: 47, figs 104–105, 111–112.

Type material. 5 syntypes MNHN.

Type locality. West of Portugal, 1224 m.

Material examined. Azores. Mission Biaçores: stn 64, 38°43'N, 28°29'W, 1200–1240 m, 1 d. – Stn 179, 38°05.5'N, 25°46'W, 1590–1665 m, 1 lv. – **Madeira.** SEPLAT Madeira: COV7, 769 m, coll. F. Swinnen, 2 dd sub, 3 dd juv.

Distribution. Off Portugal and western Spain, 1224–1674 m (Dautzenberg & Fischer, 1896), Azores 1240–1590 m (Locard, 1898), Cape Verde, 495–618 m (Locard, 1898); Madeira, 769 m.

Remarks. The main characteristics of this species are :
- height up to 10.5 mm, width up to 12 mm;
- a moderately high spire, a cyrtoconoidal shape, with up to 6 whorls;
- 2 primary granular cords on spire whorls; P1 the strongest with strong, sharp, spaced nodules; P2 weaker than P1; P3 the weakest with more crowed, smaller nodules than P2;
- 4 thin granular spiral cords on the base; interspace between cords about 1.5 to 2 times as broad as cords;
- a broad umbilicus, with gently sloping walls; sometimes a thin spiral cord within;
- a light brownish colour.

Calliotropis ambigua
(Dautzenberg & H. Fischer, 1896)
Figs 40–43

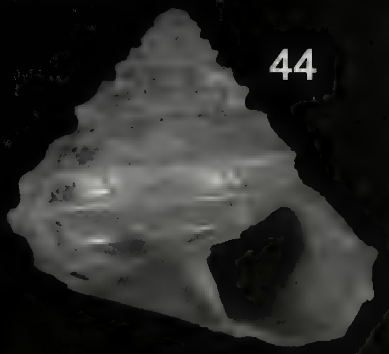
Solariella ambigua Dautzenberg & H. Fischer, 1896: 476–477, pl. XX, fig. 11.
Solariella ambigua – Dautzenberg & H. Fischer, 1897: 171.

Type material. 4 syntypes MOM (INV-19937, INV-21030).

Type locality. Azores, 1385 m.

Figures 44–53. Scale bars: 5 mm.

44–47. *Calliotropis talismani* (Locard, 1897).
44–45. Syntype MNHN, Atlantic Morocco, 1350 m [TALISMAN 1883, stn DR33], 7.9 x 8.9 mm;
46–47. NNML, Canary Islands, south Fuerteventua, Punta de Jundia, 870 m [CANCAP–II, stn 2.079], 5.2 x 5.6 mm.
48–49. *C. rudecta* (Locard, 1897), holotype MNHN, Atlantic Morocco, 1900 m [TRAVAILLEUR 1882, stn DR40], 4.3 x 3.5 mm.
50–53. *C. valida* (Dautzenberg & H.Fischer, 1896), syntypes MOM (INV-21029), Cape Verde Islands, 1311 m [PRINCESSE–ALICE II, stn 1193]. **50–51.**, 13.6 x 17.2 mm; **52–53.** 13.7 x 15.3 mm.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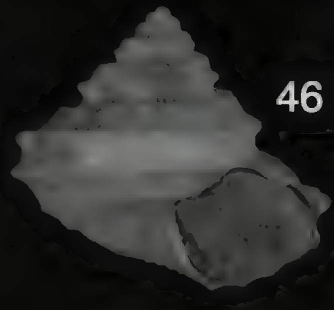
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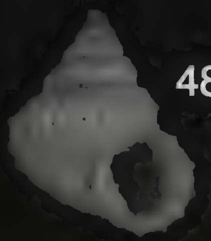
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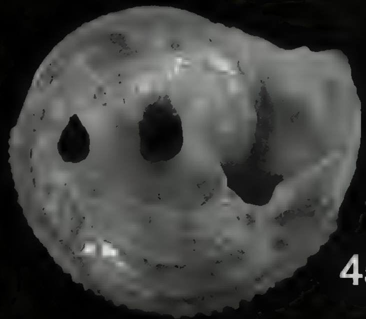
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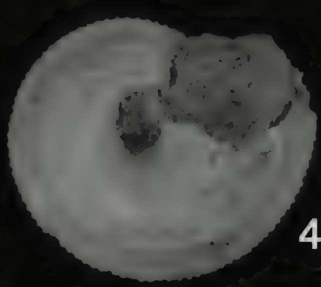
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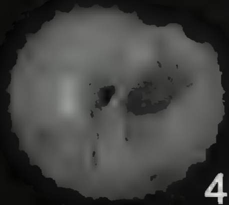
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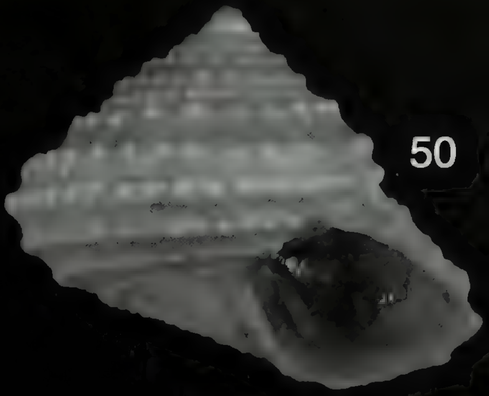
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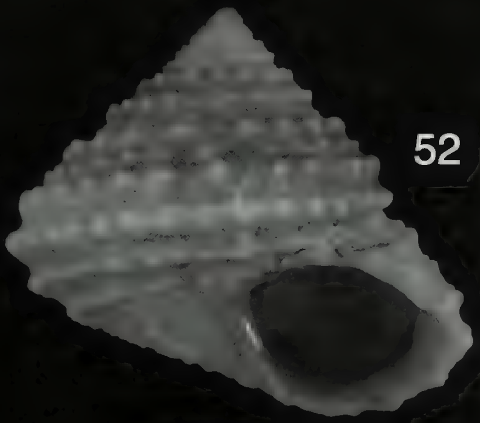
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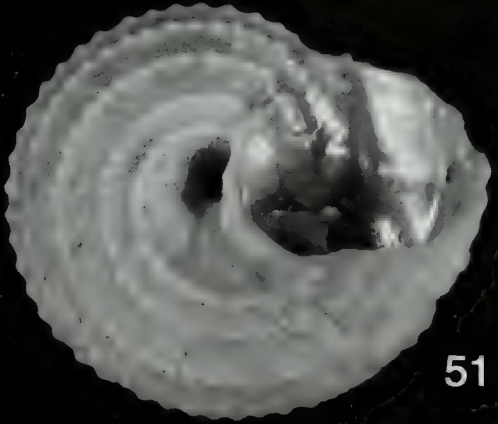
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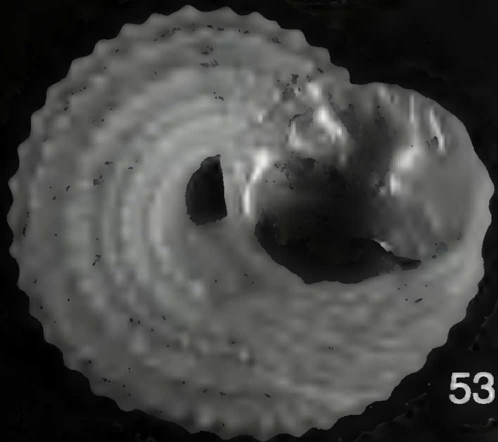
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Material examined. Azores. PRINCESSE ALICE I: stn 553, 37°42'40"N, 25°05'15"W, 1385 m, 3 lv (syntypes MOM). – MNCN, 1250 m, 2 dd. – **Canary Islands.** CANCAP II: stn 2.082, 28°00'N, 14°26'W, 1130 m, 3 dd juv. – **Madeira.** CANCAP I: stn 1.031, 32°40'N, 16°43'W, 1085 m, 10 dd juv. – Stn 1.044, 32°42'N, 16°42'W, 815 m, 1 dd, 1 dd sub & 2 dd juv. – Stn 1.062, 32°40'N, 16°46'W, 680 m, 1 dd & 4 dd juv. – CANCAP III: stn 3.028, 33°01'N, 16°20'W, 740 m, 9 dd juv. – Stn 3.051, 32°40'N, 16°40'W, 1100 m, 3 dd juv. – **Cape Verde Islands.** CANCAP VI: stn 6.065, 15°58'N, 22°33'W, 950–1040 m, 2 lv.

Distribution. Azores, 454–1557 m (Dautzenberg & Fischer, 1896), Canary Islands, 1130 m, Madeira, 680–1100 m, Cape Verde, 950–1040 m.

Remarks. The main characteristics of this species are :

- height up to 9.5 mm, width up to 11.5 mm;
- a moderately high spire, a cyrtoconoidal shape, with up to 6 whorls;
- 2 primary granular cords on spire whorls; P1 the strongest with strong, rounded blunt, spaced nodules; P2 weaker than P1; P3 the weakest with more crowed, smaller nodules than P2;
- 4 thin granular spiral cords on the base; interspace between cords about 1.5 to 2 times as broad as cords;
- a broad umbilicus, with gently sloping walls; sometimes a 3 spiral cords within;
- a light brownish colour.

This species is clearly close to *C. vaillanti* (P. Fischer, 1882). Dautzenberg and Fischer (1896) seem to consider that the two species are the same in comments of their description of *C. valida* (1906). So did also Dautzenberg (1927) in his records of *C. vaillanti*. But, considering the available material, *C. ambigua* seems to be different in having larger, blunt (not clearly sharp), less numerous nodules on P1 (about 8 instead of about 10) and 3 spiral cords inside the umbilicus (instead of only one at the most).

Calliotropis globosa Quinn, 1991
Figs 25–28

Calliotropis globosa Quinn, 1991: 168–170, figs 7–8.

Type material. Holotype and 2 paratypes USNM (859419 & 859420); 2 paratypes Academy of Natural Sciences of Philadelphia – ANSP (383289), 2 paratypes Florida Marine Research Institute – FSBC I (39515), 2 paratypes Florida Museum of Natural History – UF (169956), 2 paratypes Museum of Comparative Zoology Harvard University – MCZ (302452), 2 paratypes American Museum of Natural History – AMNH (232160), 2 paratypes University of Miami – UMML (308358).

Type locality. Jamaica, *John Elliott Pillsbury* stn P–1262, 17°21.4'N, 77°34.8'W, 805–1089 m.

Material examined. Madeira. Said to be found at south–east of Porto Santo, 32°26'N, 15°11'W, 790–840 m, B. Van Heugten coll., 2 dd.

Distribution. Jamaica, Cuba and American coast, from Yucatan to Venezuela and Suriname, 700–1100 m (Quinn, 1991); Madeira, 790-840 m.

Remarks. The main characteristics of this species (following the original description) are :

- height up to 9.7 mm, width up to 8.7 mm;
- a high spire, a slightly cyrtoconoidal shape, with up to 6 whorls;
- 3 granular cords on spire whorls;
- 4 granular spiral cords on the base;
- a sigmoid columella with a median tooth;
- a broad umbilicus without spiral cord within;
- a white nacreous colour.

The fact that this western Atlantic species, of which we got only one single record of 2 dead specimens, belongs to eastern Atlantic malacofauna needs certainly confirmation.

On the other hand, the presence of such a median columellar tooth (that can be seen on the illustration of the holotype in the original description) is amazing for a *Calliotropis* species. Further studies could maybe lead to move this species into Seguenziidae Verrill, 1884.

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NOVAPEX 9 (1): 33-40, 10 avril 2008

Evaluation et cartographie des stocks de coquillages comestibles dans la lagune de Bizerte (Nord de la Tunisie)

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MOTS CLES. lagune de Bizerte, coquillages comestibles, biomasses, abondances, distribution.

KEYWORDS. Bizerte lagoon, edible shellfishes, biomasses, abundance, distribution.

RESUME. Le présent travail s'intéresse à inventorier et à cartographier les espèces de coquillages comestibles et à estimer leurs biomasses respectives dans la lagune de Bizerte. Les opérations de prospections et de prélèvements des échantillons se sont déroulées pendant les mois d'août et de septembre 2002. Durant cette période, 181 stations ont été échantillonnées à l'aide d'une benne Van Veen, et par une quadra pour les stations côtières. On opère toujours 3 prélèvements par stations sur une surface totale de 0,3 m^2. L'inventaire de la faune malacologique nous a permis de recenser 11 espèces comestibles, 2 gastéropodes et 9 bivalves. Dans le présent travail, on s'est intéressé à l'étude de 3 espèces seulement qui sont les plus abondantes. Les calculs de biomasse ont montré que l'espèce *Flexopecten glaber* (Linné, 1758) est la plus abondante (10,32 10^6 individus), suivi par *Cerastoderma glaucum* (Poiret, 1789) (3,39 10^6 individus) et *Ruditapes decussatus* (Linné, 1758) (9,96 10^5 individus). La distribution de leurs abondances respectives a montré que l'espèce *Flexopecten glaber* est répartie sur presque toute la lagune.

ABSTRACT. In order to evaluate the edibles shellfish biomasses, the malacological associations and their distribution in Bizerte lagoon (North Tunisia) were studied. Prospections and sampling were carried out during August and September 2002. In this study, 181 stations were prospected and samples were taken in triplicates from a total surface area of 0.3 m^2 using a Van Veen grab and a quadra for the coastal stations.

The inventory of the malacological fauna in Bizerte lagoon showed a total of 11 edible species (2 gastropods and 9 bivalves). Among these species, *Flexopecten glaber* (Linné, 1758) is the most abundant (10,32 10^6 individus), then *Cerastoderma glaucum* (Poiret, 1789) (3,39 10^6 individus) and *Ruditapes decussatus* (Linné, 1758) (9,96 10^5 individus). Their abundance distribution demonstrated that *Flexopecten glaber* was present in all lagoon sampled stations.

INTRODUCTION

Les coquillages comestibles présentent un grand intérêt économique dans plusieurs pays du monde. Leur contribution au secteur de la pêche et de l'aquaculture ne cesse d'augmenter. En Tunisie, les coquillages exploités et exportés sont limités exclusivement à la palourde, *Ruditapes decussatus* (Linné, 1758). Plusieurs autres espèces de bivalves et de gastéropodes comestibles qui se prêtent bien à l'exportation sont présentes sur nos côtes (Azzouz, 1966 ; Zaouali, 1974, 1978, 1979 ; Belkhodja, 2003) mais ne font l'objet d'aucune exploitation. La lagune de Bizerte, située au nord de la Tunisie, est connue par des activités de pêche et de conchyliculture anciennes (El Bour, 1998) et importantes. C'est ainsi que plusieurs études faunistiques et malacologiques relatives à ce plan d'eau ont été effectuées (Zaouali, 1974, 1979, 1984 ; Belkhodja, 2003). Cependant, l'évaluation de la biomasse de ces coquillages potentiellement exploitables n'a jamais été réalisée.

L'objectif de ce travail est d'identifier et d'estimer les stocks de ces coquillages et de cartographier leurs abondances dans la lagune. Outre *Ruditapes decussatus* (Linné, 1758), deux autres espèces ont été étudiées : *Cerastoderma glaucum* (Poiret, 1789) et *Flexopecten glaber* (Linné, 1758). Ce choix d'espèces a été guidé par leur valeur commerciale à l'échelle de l'exportation.

Matériel et Méthode

Site d'étude

La lagune de Bizerte est située au nord-est de la Tunisie, à proximité de la ville de Bizerte (Fig.1). Elle s'inscrit au niveau de la latitude entre 37° 08' N et 37°16' N, et de la longitude entre 9°48'E et 9°56'E. Sa superficie est d'environ 130 km^2 (N-S, 11 km, E-O, 13 km). Sa profondeur maximale est de 12 mètres, au niveau du chenal artificiel qui relie l'arsenal de la ville de Menzel Bourguiba au canal de Bizerte. Ce chenal est maintenu par des dragages car la majeure partie de la lagune a une profondeur qui varie entre 5 et 10 mètres (Mansouri, 1996). Dans sa partie ouest, la lagune de Bizerte est reliée au lac Ichkeul par l'oued Tinja. La lagune de Bizerte constitue un bassin récepteur du réseau hydrographique environnant dont le plus important est le lac Ichkeul, qui reçoit lui-même les déversements de quatre oueds (Zaouali, 1979).

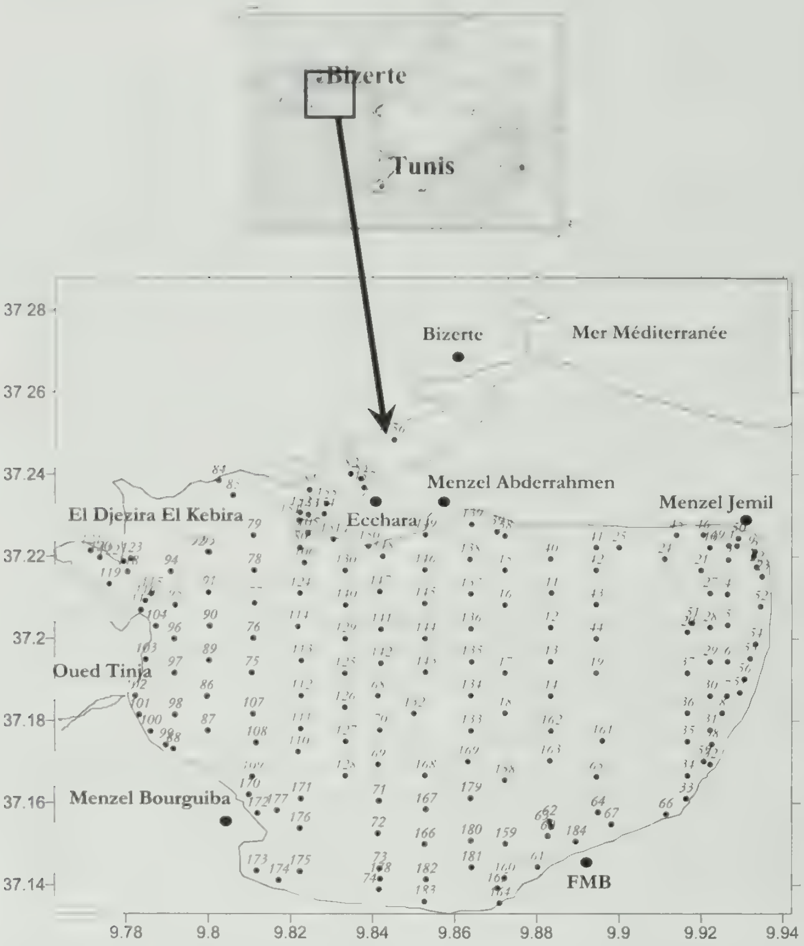


Figure 1 : Site d'étude et localisation des stations d'échantillonnage

Echantillonnage

Une campagne d'échantillonnage a été réalisée pendant les mois d'août et de septembre 2002. Les stations, au nombre de 181, sont positionnées à l'aide d'un GPS Garmin II plus. Elles sont fixées selon un échantillonnage systématique en quinconce. On a procédé à un quadrillage de la carte de la lagune de Bizerte en mailles carrées de 800 mètres de côté, sur lesquelles on a choisi les stations. Au cours de la campagne, ces stations ont été validées ou rectifiées suivant la réalité du terrain (Fig. 1). Les prélèvements ont été réalisés à l'aide d'une benne Van Veen de 0,1 m^2 et d'une pénétration dans le sédiment de 30 cm environ. Son efficacité dans différents sédiments a été testée (Christie, 1975). Dans chaque station, 3 réplicats au hasard sont échantillonnés avec une surface totale d'échantillonnage de 0,3m², ceci étant un nombre d'unité d'échantillonnage suffisant pour récolter une proportion importante d'espèces du fond (Mistri et al., 2001), soit au total un nombre de 540 prélèvements. Pour les stations côtières où les profondeurs sont très faibles, l'utilisation de la benne n'était plus possible. On a alors utilisé, un quadra de 30 x 35 cm et on a toujours procédé à 3 prélèvements jusqu'à une profondeur de pénétration de 30 cm. Le contenu de la benne a été tamisé dans l'eau de la lagune, à bord de la barque au moyen d'un tamis de mailles carrées de 2 mm de côté. Le refus, composé d'organismes de taille supérieure à 2 mm, est fixé au formol à 10 %. Chaque refus a passé par un tamisage hydraulique sur une colonne de trois tamis, permettant de fractionner l'échantillon suivant un critère dimensionnel pour faciliter le tri. Le refus de chaque tamis a été trié dans un bac. Les organismes ayant gardé l'aspect vivant sont conservés dans des piluliers contenant de l'alcool à 70°. Pour chaque individu des espèces commercialisables, on a déterminé la longueur totale, qui correspond à la dimension maximale selon l'axe antéro-postérieur de la coquille pour le cas des bivalves, et à la dimension entre l'extrémité de l'apex et celle du canal siphonal dans le cas des gastéropodes, ensuite les spécimens sont pesés. Les mensurations et la pesée ont été effectuées respectivement à l'aide d'un pied à coulisse digital à 0,01 mm près et une balance de précision au 0,001g près. Plusieurs espèces à intérêt commercial ont été recensées [*Donax trunculus* Linné, 1758, *Hexaplex trunculus* (Linné, 1758), *Bolinus brandaris* (Linné, 1758), *Acanthocardia paucicostata* (Sowerby, 1841)]. Les espèces retenues dans cette étude sont les trois bivalves : *Flexopecten glaber*, *Cerastoderma glaucum* et *Ruditapes decussatus* (Figure 2), vu leur intérêt commercial et leur abondance.

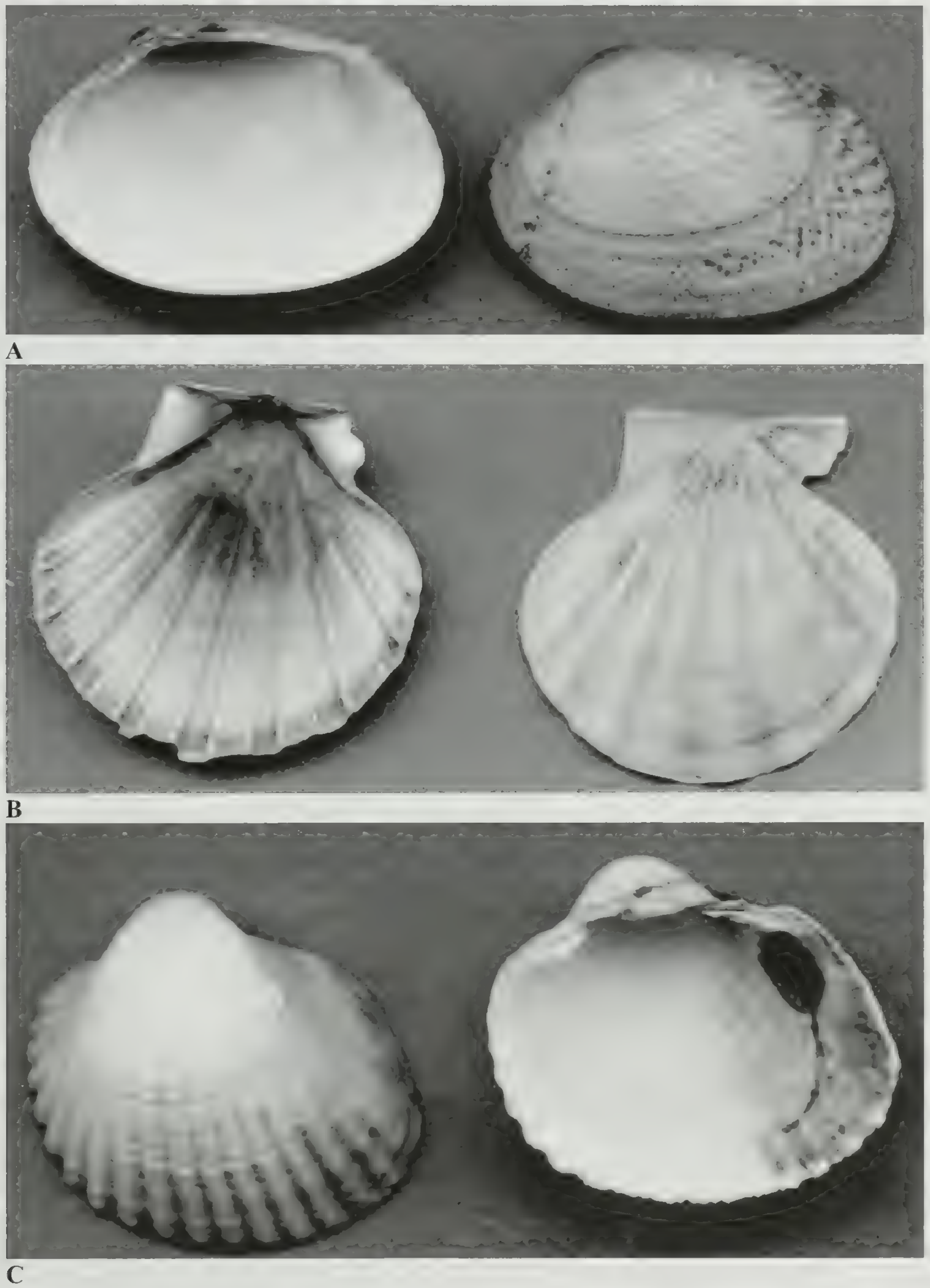


Figure 2: Photos des 3 espèces de bivalves étudiés. **A.** *Ruditapes decussatus* ((Linné, 1758), 38 mm; **B.** *Flexopecten glaber* (Linné, 1758), 43 mm; **C.** *Cerastoderma glaucum* (Poiret, 1789) 30 mm.

Analyse des données

Pour l'évaluation directe de l'abondance et de la biomasse des différentes espèces étudiées, on a eu recours à la méthodologie de Fifas, utilisée dans l'évaluation des stocks des bivalves présents dans le golfe normand-breton (Pitel et al., 2004) et dans l'évaluation du stock de palourdes du bassin d'Arcachon (Bertignac et al., 2001). Les estimations sont exprimées en termes d'abondance et de biomasse. L'abondance par station est désignée par T_i selon la relation suivante:

$$T_i = \frac{S}{s}\frac{1}{k_i}\sum_{j=1}^{ki} Cij \sum_{l=l\min}^{l\max} Xijl \qquad (1)$$

S: la surface de la station échantillonnée donnée par: $S = \pi \frac{D^2}{4}$

D: le diamètre du cercle d'activité de la barque autour des coordonnées du point moyen demandé (point théorique) ; ici, D= 4,55 m;
s: surface de l'unité d'échantillonnage;
k_i: nombre de replicats par station i (3 replicats par station);
C_{ij}: le rapport effectif capturé/effectif mesuré par station i et replicat j (ce rapport est toujours égal à 1 dans notre cas);
X_{ijl}: l'effectif mesuré par classe de taille l, station i et replicat j;
l_{max}: taille maximale et **l_{min}** : taille minimale.

Les résultats de l'abondance des trois espèces étudiées, *Flexopecten glaber*, *Cerastoderma glaucum* et *Ruditapes decussatus*, sont cartographiés au moyen du logiciel « Surfer.7 ».

L'abondance totale dans la lagune pour chacune des espèces étudiées, toutes classes de tailles confondues désigné par T, est donnée par:

$$T = \frac{S}{n.s}\sum_{i=1}^{n}\frac{1}{k_i}\sum_{j=1}^{ki} Cij \sum_{l=l\min}^{l\max} Xijl \qquad (2)$$

S: surface totale de la lagune de Bizerte (130 km^2);
s: surface de l'unité d'échantillonnage; la benne (0,125 m^2);
n: nombre de stations sur toute la lagune (181 stations).

La biomasse totale dans toute la lagune toutes classes de tailles confondues, désignée par B, est exprimée selon l'équation suivante:

$$B = \frac{aS}{ns}\sum_{i=1}^{n}\frac{1}{k_i}\sum_{j=1}^{ki} Cij \sum_{l=l\min}^{l\max} X_{ijl}\; l^b \qquad (3)$$

S: surface totale de la lagune de Bizerte (130 km^2);
s: surface de l'unité d'échantillonnage ; la benne (0,125 m^2);
n: nombre de stations sur toute la lagune (181 stations);
a et b: coefficient de la relation taille-poids.

Pour l'évaluation des biomasses respectives des trois espèces, on a utilisé les paramètres a et b de la croissance relative qui existent dans la littérature selon l'équation **$Wt=a.Lt^b$.** A notre meilleure connaissance, il n'existe pas de travaux portant sur la croissance de *Cerastoderma glaucum* dans la lagune de Bizerte, on a dès lors établi la relation taille-poids à partir des échantillons récoltés.

Résultats

L'extrapolation par l'équation (3) nous a permis d'évaluer les biomasses de coquillages jugés commercialisables. Les paramètres de la croissance relative nécessaires à cet effet ont été calculés pour *Cerastoderma glaucum* seulement (Tableau 1). Le tableau 2 montre que l'espèce *Flexopecten glaber* est la plus abondante et la plus importante du point de vue de la biomasse suivie par *Cerastoderma glaucum* et *Ruditapes decussatus*.

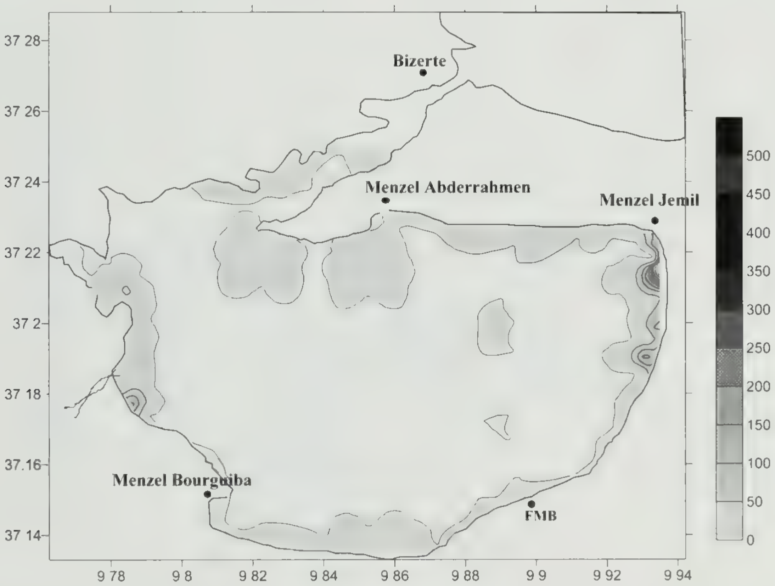
Espèce	**N**	**Equation**	**Lt (mm)**	**R**	**Travail**
C. glaucum	647	Wt=0,0002 Lt^{3,0478}	9,545	0,8412	Présent
R. decussatus	360	Wt=1,317.10^{-4} Lt^{3,0784}	32,19	0,9604	El Mnif (1995)
F. glaber	2085	Wt=0,0001 Lt^{3,068}	7,54	0,96	Ben Nakhla (2002)

Tableau.1 : Equations liant la taille au poids
N : effectif ; R : coefficient de corrélation; Lt : taille moyenne dans l'échantillon.

Espèce	*Cerastoderma glaucum*	*Ruditapes decussatus*	*Flexopecten glaber*
Biomasse (en tonnes)	192,450	1,918	6597,323
Abondance (en nombre d'individus)	3,39.10^{6}	9,96.10^{5}	10,32.10^{6}

Tableau 2: Résultats de l'estimation des biomasses et des abondances totales

Les résultats de l'extrapolation de l'abondance par station ont permis de les cartographier et de déterminer leurs distributions dans la lagune. La cartographie des abondances indique que la palourde se rencontre dans le cordon littoral de la lagune avec en particulier deux régions à fortes concentrations (Fig. 3). Ces régions sont situées à l'ouest au voisinage de l'oued de Tinja et à l'est de la lagune où l'abondance dépasse 500 individus/m^2.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Bizerte
Menzel Abderrahmen
Menzel Jemil
Menzel Bourguiba
FMB
500
450
400
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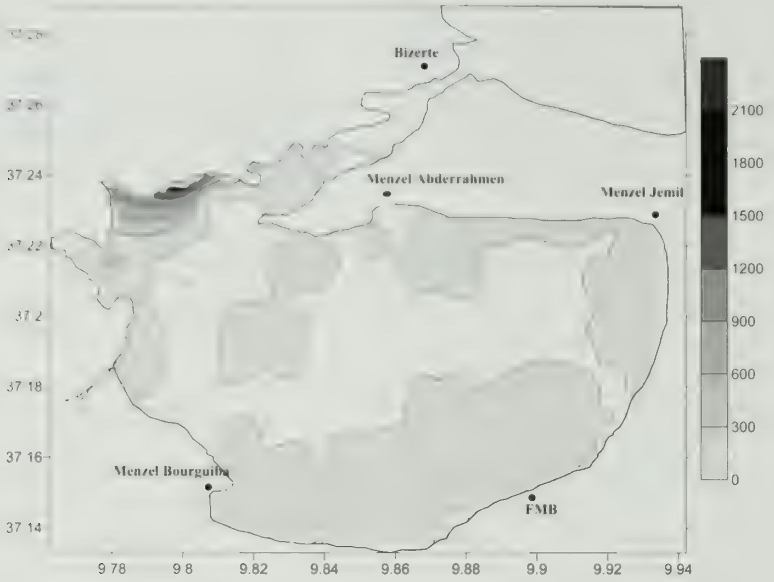
300
250
200
150
100
50
0

Figure 3: Distribution de l'abondance de *Ruditapes decussatus* (individus/m^2)

Les coques glauques, *Cerastoderma glaucum*, sont distribuées dans toute la zone de la lagune à l'exception de la zone centrale (Fig. 4.).


Bizerte
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Menzel Jemil
Menzel Bourguiba
FMB
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9.82
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9.88
9.9
9.92
9.94
2100
1800
1500
1200
900
600
300
0

Figure 4 : Distribution de l'abondance de *Cerastoderma glaucum* (individus /m²).

La plus forte abondance est observée au nord ouest où elle dépasse 2100 individus/m^2. 73% de ceux-ci ont des tailles ne dépassant pas 10 mm.

Flexopecten glaber est distribuée sur presque toute l'étendue d'eau. Elle est la plus présente dans la lagune. On la rencontre au nord, au sud, à l'est, à l'ouest et au centre de la lagune ainsi qu'au niveau du canal qui relie la lagune de Bizerte à la mer. Elle est plus abondante au nord-est et au nord-ouest au niveau du canal de la navigation où les abondances dépassent 600 individus /m² (Fig.5).

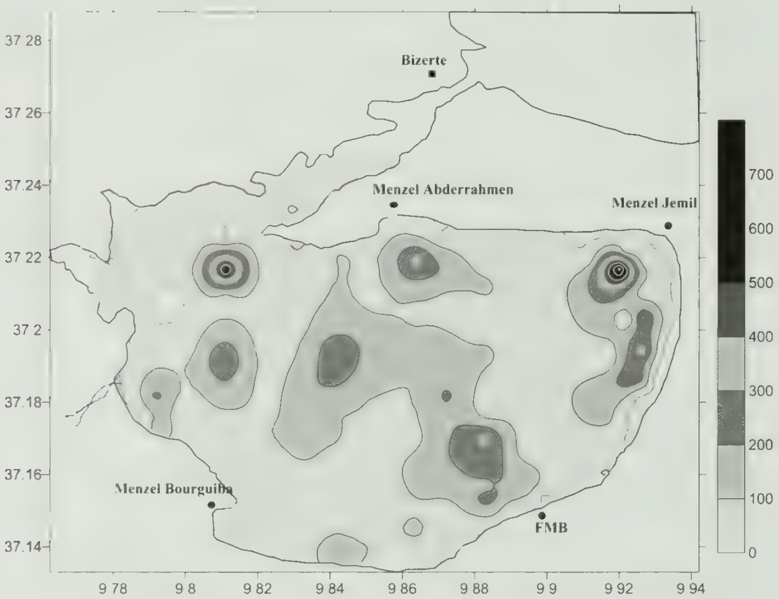
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Figure 5 : Distribution de l'abondance de *Cerastoderma glaucum* (individus /m²).

Flexopecten glaber est très abondante dans la lagune de Bizerte mais la fréquence maximale par station est faible par rapport à celle de *Cerastoderma glaucum* (Tableau 3). En effet, la cartographie des abondances a montré que pour chaque espèce, il existe des zones préférentielles caractérisées par de fortes abondances.

Espèce	*F .glaber*	*R. decussatus*	*C. glaucum*
Ab/st(min-max)ind/m²	3,333 – 760	3,33 - 560	3,33 – 2443,33
Lt (min-max) mm	4,2 – 59,6	2,9 – 39,4	2 – 48,9
Nombre d'individus	4289	414	1410

Tableau 3 : Valeurs extrêmes estimées des abondances par station et des tailles des espèces étudiées

Discussion

Selon Medhioub (1993), la palourde est répartie sur tout le littoral du golfe de Gabès, dans la lagune de Tunis et dans la lagune de Bizerte avec une faible abondance. Cette localité est définie par cet auteur comme une zone pauvre en palourdes. En effet, la comparaison des résultats de l'abondance et de la biomasse avec ceux trouvées par Zamouri et al. (2005) a montré que *Ruditapes decussatus* est une espèce plus importante dans le lac nord de Tunis que dans la lagune de Bizerte (Tableau 2). La répartition des différentes espèces est liée à la nature du fond et l'hydrodynamisme de la lagune. La distribution de l'abondance de *Ruditapes decussatus* dans la lagune de Bizerte a montré que cette palourde est présente sur toute la frange littorale et dans le goulet, ce qui concorde avec les résultats de Belkhodja (2003). Cette répartition est à mettre en relation avec le type du substrat : la palourde est présente dans les zones à fort hydrodynamisme et dont la nature du sédiment est très hétérogène (Bouxin, 1936 ; Latrouite et al., 1976). Dans la lagune de Bizerte, cette espèce est présente sur les fonds vaso-sableux où la fraction sableuse est importante (Soussi et al., 1983 ; Hamdi et al., 2002 ; Belkhodja, 2003). *Cerastoderma glaucum* est une espèce paralique recensé par Frisoni et al (1986) au débouché d'oued Tinja et au nord-est et en faible abondance dans sa bande littorale est (Belkhodja, 2003). On a également rencontré cette espèce à l'est, à l'embouchure de l'oued Tinja, et dans quelques stations du nord de la lagune. Elle est aussi rencontrée au sud, et au niveau du canal de Bizerte. Les plus fortes abondances sont recensées au niveau d'El Jezira El Kabira qui correspond à une station côtière très abritée (accès à pied). Cette forte abondance dépassant 2400 ind/m² est dominée par des spécimens de petites tailles. En effet, la distribution de *Cerastoderma glaucum* suit un gradient de confinement croissant où l'augmentation de la densité engendre une diminution de la taille (Guerloget et al., 1983). Les cartes de distribution des abondances, nous permettent de constater que *Cerastoderma glaucum* cohabite avec *Ruditapes decussatus* et préfère les substrats sableux, sablo-vaseux et vaso-sableux. L'espèce la plus présente et la plus abondante dans le site d'étude est *Flexopecten glaber*. Elle est répartie sur toute la lagune ce qui confirme ainsi le travail de Ben Nakhla (2002). Les fortes abondances sont limitées au nord-est et à l'ouest au niveau du canal de navigation. La carte de distribution de cette espèce a montré qu'elle se trouve présente dans les faciès argilo-silteux et qu'elle se concentre sur les fonds argileux de la région centrale de la lagune et du canal de navigation (Soussi et al., 1983 ; Hamdi et al., 2002 ; Belkhodja, 2003). Belkhodja (2003) a aussi recensé cette espèce dans la zone centrale et à l'ouest de la lagune sur des fonds sablo-argileux et argileux riches en matières organiques. Elle est également retrouvée au nord-est de la lagune.

Conclusion

Ce travail nous a permis de déterminer les biomasses totales ainsi que les zones de distribution de trois espèces de bivalves qui possèdent un intérêt commercial, notamment au niveau de l'exportation. *Flexopecten glaber* possède la biomasse la plus importante, elle est suivie par *Cerastoderma glaucum* puis *Ruditapes decussatus*. Par ailleurs, elle se concentre principalement au nord-est et dans le canal de navigation, *C. glaucum* est plus abondante au nord-ouest alors que *R. decussatus* se trouve principalement à l'est et à l'embouchure de l'Oued Tinja.
Pour mieux préserver les stocks de ces coquillages, il faudrait suivre leur exploitation et déterminer les biomasses exploitables respectives. L'étude d'engins appropriés pour la pêche de *Flexopecten glaber* et *Cerastoderma glaucum* doit être programmée. En effet, si *Ruditapes decussatus* est pêché à pied au moyen d'une faucille dans la lagune de Bizerte, les deux dernières espèces ne sont le sujet d'aucune exploitation.

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The genus *Afer* Conrad, 1858 (Gastropoda: Buccinidae), with descriptions of a new subgenus and a new species from western Africa

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KEY WORDS. *Afer*, *Streptosiphon*, Senegal, Mauretania, new subgenus, new species.

ABSTRACT. A remarkable species of *Afer* from Mauretania is described as new. The generic placement is based on protoconch morphology, which is identical to the other known *Afer* species. Conchological characteristics of the teleoconch whorl are peculiar and serve as the basis for the new subgenus *Praecantafer* subgen. nov. to accommodate the new species: *Afer* (*Praecantafer*) *echinatus* sp. nov. Species formerly assigned to *Streptosiphon* Gill, 1867 are confirmed as distinct from typical *Afer* Conrad, 1858 and the status of *Streptosiphon* is restored at the subgeneric level.

INTRODUCTION

The description of this new species is based on two specimens that were collected some 30 years apart. Both specimens originate from the by-product of fisheries surveys carried out on the rich bottoms of the coastal Sahara upwelling, extending from southern Morocco to Mauritania. The holotype was collected in 1982 onboard R/V *N'Diago* by Dr Bertrand Richer de Forges while he was working for the Centre National de Recherche Océanographique et des Pêches (CNROP) in Nouadhibou, Mauretania. The origin of the paratype is less precise. It was collected during a fishery survey carried in the 1950s onboard R/V *Président Théodore Tissier* by what was then the French Institut Scientifique et Technique des Pêches Maritimes (ISTPM); regrettably, the samples were incompletely labelled and the station data are lost, but we know that the survey sampled southern Morocco and/or Mauretania. Although the region is the target of intensive commercial fisheries, it has remained almost unexplored by academic research vessels, and the new *Afer* may be less rare than indicated by the finding of just two specimens in 30 years.

Abbreviations.

BM(NH): British Museum (The Natural History Museum), London, England
KBIN: Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium
KF: Collection Koen Fraussen, Aarschot, Belgium.
KMMA: Klaipeda Maritime Museum and Aquarium, Klaipeda, Lithuania
MNHN: Muséum national d'Histoire naturelle, Paris.France
NMBE: Naturhistorisches Museum Bern, Bern, Switzerland
ZMA: Zoologisch Museum, University of Amsterdam, Amsterdam, Netherlands
ZMB: Museum für Naturkunde (Zoologisches Museum), Humboldt Universität, Berlin, Germany

SYSTEMATICS

BUCCINIDAE Rafinesque, 1815

Genus ***Afer*** Conrad, 1858
Afer Conrad 1858. Type species: "*Fusus afer* (Lamarck)" by original designation = *Murex afer* Gmelin, 1791 (type locality: "Habitat ad Senegal").

The genus *Afer* went through a confusing taxonomic history. It was placed in several families: "Fusidae" by Tryon (1881: 69, for *Afer afer*), Buccinidae by Tryon (1881: 99, for *Streptosiphon porphyrostoma*), "Vasidae" (now Turbinellidae) by Thiele (1931: 343) and Wenz (1941: 1306), Fasciolariidae by Abbott (1959: 15), Buccinidae by MacNeil (1960: 75, with *Siphonofusus* Kuroda & Habe, 1954 a synonym of *Afer*), Turbinellidae by Abbott & Dance (1986: 210) and Vaught (1989: 52, as a subgenus of *Tudivasum* Rosenberg & Petit, 1987). Not untill 2000 (Fraussen & Hadorn, 2000: 28-42), when the radulae of the known Atlantic species were prepared and the placement in Buccinidae confirmed.
The genus was used in a broad sence by Fraussen & Hadorn (2000: 28-42) and Monsecour & Monsecour (2005: 23-32), without subgeneric splitting. In the present study *Streptosiphon* is recognized as distinct from typical *Afer* and retracted from its synonymy. *Streptosiphon* is restored at the subgeneric level. In addition, *Praecantafer* subgen. nov. is described to accommodate the peculiar *Afer* (*Praecantafer*) *echinatus* sp. nov.
Still no opportunity has appear to study the radula of *Afer cumingi* (Reeve, 1844), a species from Japan and Taiwan. *A. cumingi* is conchologically similar to the

West African species, but the lower columellar tooth is folded in a particular way similar to the genus *Tudicla* Röding, 1798. Further study is needed to confirm the generic placement of this species.

In the present paper only the Recent species are discussed.

Wenz (1941) considered the following two fossil taxa as subgenera of *Afer*. Further study is required to either confirm their subgeneric status or to recognize them as distinct genera:

Hercorhyncus Conrad, 1868 (type species: *Fusus tippanus* Conrad, 1860) from the Cretaceous of the USA, placed in Vasidae, as subgenus of *Afer*, by Wenz, 1941; placed in Fusininae, by Sohl 1964a (220) & 1964b (376); placed in Fasciolariidae (Cretaceous Group) by Snyder (2003: 237).

Streptopelma Cossmann, 1901 (type species: *Peristernia linteus* Tate, 1888) from the Eocene of Australia, placed in Vasidae, as subgenus of *Afer*, by Wenz, 1941; placed in Fasciolariidae (Peristernia Group) by Snyder (2003: 311).

Diagnosis. Shell thick, solid. Shape broadly fusiform or slender, siphonal canal rather long, open. Protoconch typical, papilliform, higher than broad, whorls smooth and glossy. Teleoconch whorls usually with angular shoulder. Sculpture consisting of, usually dominant, spiral cords in combination with axial ribs. Aperture oval, columella curved, callus narrow and thin or broad and thick. Outer lip thick, usually with numerous internal knobs, occasionally smooth.

Radula typical buccinid. Central tooth with broad base (rather triangular or semi-oval), tricuspid. Lateral teeth with 3 pointed cusps, outermost cusp largest.

Comparison. The genus *Afer* is characterized by the multispiral, papilliform protoconch, higher than broad, smooth, glossy, with nicely rounded tip.

Serratifusus Darragh, 1969 (type species: *Fusus craspedotus* Tate, 1888, OD, from the Miocene of southeast Australia) differs in having a smaller protoconch with a deviated axis for the first whorl, an even longer siphonal canal which may be bended or torsed and a radula with more rectangular central cusp. The genus *Serratifusus* has, together with *Afer* (and especially its subgenus *Praecantafer* subgen. nov. described below), a quite columbariid shape: a rather short spire and a long siphonal canal.

Euthria M. E. Gray, 1850 (type species: "*Fusus lignarius* Chiaje", this is *Fusus lignarius* Lamarck, 1816, a junior synonym of *Murex corneus* Linnaeus, 1758, from Mediterranean Sea) has a similar radula and may have a similar shape and pattern but differs in having a smaller protoconch, usually a shorter siphonal canal and an outer lip which has a smooth inside or with lesser pronounced internal lirae.

Euthriostoma Marche-Marchard & Brebion, 1977 (type species: *Euthriostoma gliberti* Marche-Marchard & Brebion, 1977, by original designation) differs in having a small protoconch. The shells are easily recognized by the large, heavy, white shells with high spire.

Range. West Africa, from Ivory Coast in the south (*A.* (*A.*) *afer*) to Morocco (Agadir) in the north (*A.* (*Streptosiphon*) *lansbergisi*). Maybe also West-Pacific [should "*Afer*" *cumingi* (Reeve, 1844) be shown to be referable to this genus].

Subgenus ***Afer*** Conrad, 1858
Figs. 7-8

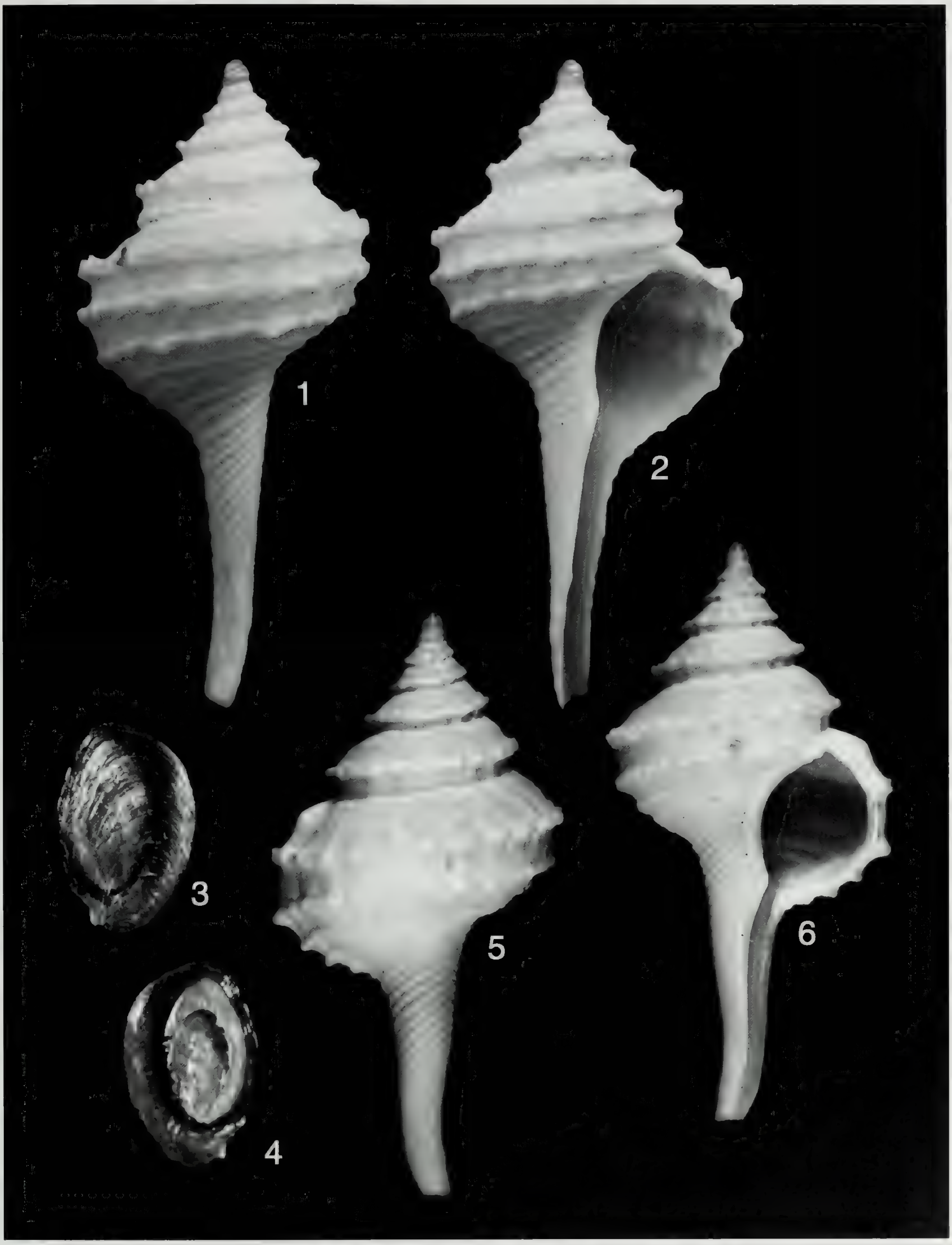
Diagnosis. Shell thick, solid. Shape from moderately slender with short spire to elongate with elegant spire, siphonal canal long, open. Protoconch typical for genus. Whorls with slightly angular shoulder, sculpture consisting of sharp spiral cords with broad interspaces and of narrow, rather sharp axial ribs. Aperture oval, columella gently curved, callus narrow and rather thin, outer lip thick with numerous internal knobs, edge sharp.

Radula typical buccinid. Central tooth rather triangular, base concave, top slightly elevated, tricuspid, cusps of equal size, central cusps eventually slightly larger. Lateral teeth with 3 pointed cusps, outermost cusp largest.

Comparison. The subgenus *Afer* is characterized by the sharp spiral sculpture and the narrow columellar lip. The radula of *A.* (*A.*) *afer* is similar to the radula of *Euthria cornea* (Linnaeus, 1758), as figured by Cooke (1917, fig. 1), with a rather triangular central tooth with concave base. For differences with *Streptosiphon* and *Praecantafer* subgen. nov. See comparisons under those subgenera.

Figures 1-6

1-6. *Afer* (*Praecantafer*) *echinatus* sp. nov.,
1-2. Mauretania, continental shelf, N. O. "N'diago" stn. 85, 20°07'N, 17°38'W, 200 m, holotype MNHN 9964, 26.7 mm; **3-4.** operculum of holotype; **5-6.** Dredged between Morocco and Senegal, R. V. "Président-Theodore-Tissier" cruise, paratype MNHN 9965, 29.5 mm.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Range. West Africa, mainly from Senegal. *A.* (*A.*) *afer* is known from as south as Ivory Coast. *A.* (*A.*) *pseudofusinus* is known from as north as northern Mauritania and from fisherman off the Canary Islands. The next two species are included in the subgenus.

Afer (*Afer*) *afer* (Gmelin, 1791)
Figs. 7-8

Murex afer Gmelin, 1791: 3558, sp. 129 (type locality: Senegal "Habitat ad Senegal").
The specimen figured by Adanson (1757, pl.8, fig.18 "Lipin") is considered the type. This specimen is probably lost.

Afer (*Afer*) *pseudofusinus* Fraussen & Hadorn, 2000

Afer pseudofusinus Fraussen & Hadorn, 2000: 32-34, figs. 1-3, 5-6 (type locality: continental shelf off Mauritania, Meteor stn. 60.78, 17°17' N, 16°28' W, 95 m deep).
Holotype MNHN 6315.

Subgenus ***Streptosiphon*** Gill, 1867
Figs. 9-10

Streptosiphon Gill, 1867: 152, as genus, type species by original designation: *Tudicla porphyrostoma* (Reeve, 1847).

Diagnosis. Shell thick, solid. Shape moderately slender with short, conical spire, siphonal canal long, open. Protoconch typical for genus. Whorls with slightly angular shoulder, smooth, sculpture consisting of fine spiral lines as interspaces and of broad, rather blunt axial ribs. Aperture oval, columella gently curved, callus broad and rather thick, forming a wide inner lip, outer lip thick with numerous internal knobs, edge sharp.
Radula typical buccinid. Central tooth broad, weakly curved, tricuspid, cusps of equal size. Lateral teeth with 3 pointed cusps, outermost cusp largest.

Comparison. *Streptosiphon* is characterized by its rather smooth shell and the broad columellar lip. The radula of *A.* (*S.*) *porphyrostoma* is similar to the radula of *Buccinulum vittatum* (Quoy & Gaimard, 1833) as figured by Cooke (1917, figs. 4-5) (his fig. 4 being forma *littorinoides*), with a broad, rather oval central tooth.
The subgenus *Afer* can be distinguished by its sharper spiral sculpture, its narrow inner lip (callus) and in having a radula with a more triangular central tooth with a more concave base and sharper edges. For differences with *Praecantafer* subgen. nov. see comparisons under that subgenus.

Range. West Africa. *A.* (*S.*) *porphyrostoma* is known from Senegal. *A.* (*S.*) *lansbergisi* is known from Mauritania in the south, along Western Sahara, to Morocco (Agadir) in the north. The next two species are included in the subgenus.

Afer (*Streptosiphon*) *porphyrostoma*
(Reeve, 1847)
Figs. 9-10

Fasciolaria porphyrostoma Reeve, 1847: pl.5, sp.11 (type locality: "Eastern Seas" is erroneous).
Sometimes, and also by Reeve himself, referred to "Adams & Reeve, Voy.Sam.", meaning the publication of "The Zoology of the Voyage of H.M.S. Samarang" in 1848-1850. The author of this species however is Reeve, 1847.
Probable holotype in BM(NH), nr. 1875.12.10.163 (Delsaerdt, 1993: 91).

Junior synonym: *Tudicla recurva* A. Adams, 1854: 135-136, sp. 26, pl.28, fig.4 (type locality: "Senegal").
5 syntypes in BM(NH) nr. 1992158.

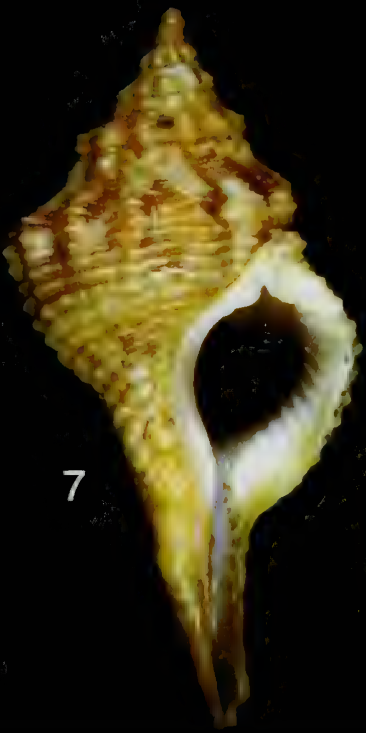
Afer (*Streptosiphon*) *lansbergisi* Delsaerdt, 1993

Afer lansbergisi Delsaerdt, 1993: 89-96, 5 figs. (type locality: "near the coast of Sierra Leone, in 15-40 m depth").
Holotype in KMMA, nr. KJM 7642

For the history of the confusion between *A. porphyrostoma* and specimens of *A. lansbergisi*, see Delsaerdt (1993: 92).

Figures 7-12

7-8. *Afer* (*Afer*) *afer* (Gmelin, 1791), 34.6 mm, Ø protoconch 1.5 mm, Gorée, Senegal, KF nr. 2959.
9-10. *Afer* (*Streptosiphon*) *porphyrostoma* (Reeve, 1847), 38.7 mm, Ø protoconch 1.7 mm, M' Bour, Senegal, 10-20 m, KF nr. 2360.
11-12. *Afer* (*Praecantafer*) *echinatus* sp. nov., holotype, 26.7 mm, Ø protoconch 1.3 mm, off Mauretania, 200 m, MNHN.



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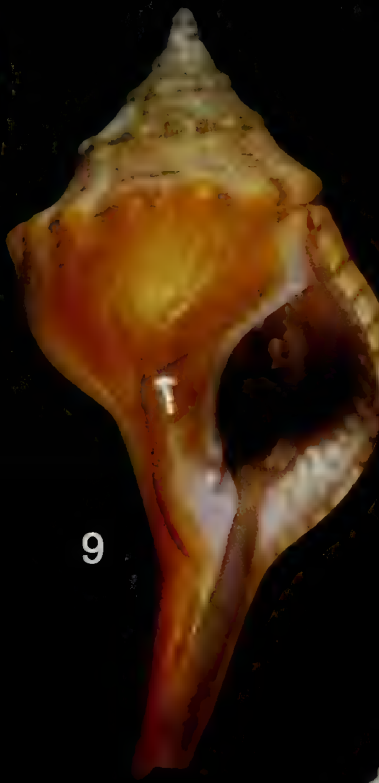

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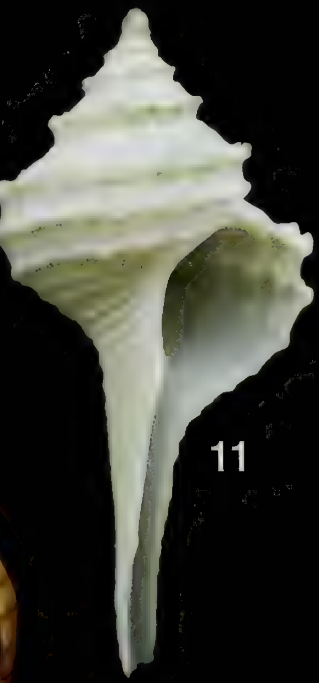

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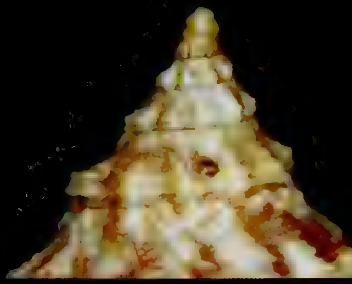

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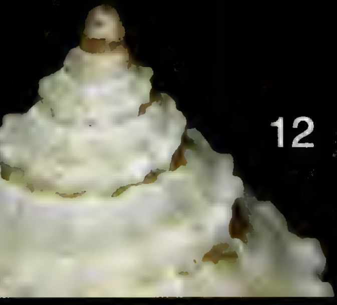

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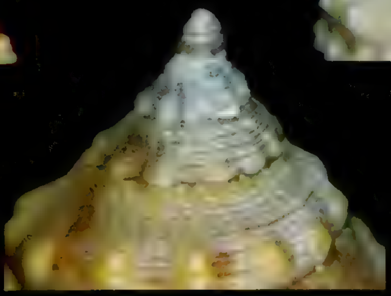

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Praecantafer subgen. nov.

Type species. *Afer* (*Praecantafer*) *echinatus* sp. nov.

Diagnosis. Shell thin but solid. Shape columbariiform, spire rather short, siphonal canal long, straight, open. Protoconch rather papilliform, higher than broad, typical for genus. Whorls with angular shoulder. Sculpture consisting of at least 2 pronounced, peripheral spiral cords with broad interspaces. Spiral cords on base and siphonal canal weaker. Axial sculpture consisting of sharp spines on top of spiral cords. Aperture oval, columella gently curved, callus narrow and rather thin, outer lip usually thick without internal knobs, edge blunt.

Comparison. The subgenus *Afer* differs from *Praecantafer* in having a larger number of spiral cords, a shorter siphonal canal, an outer lip with internal lirae and a sharp edge. The subgenus *Streptosiphon* differs in having a smoother sculpture, a usually shorther siphonal canal, an outer lip with internal lirae and a sharp edge.

Range. Only known from the type species. Off West Africa, in deep water.

Etymology. *Praecantafer* subgen. nov. is named after the Latin expression *praecantare* (verb), meaning "bewitching" which refers to the enchanting shell.

Afer (*Praecantafer*) *echinatus* sp. nov.

Figs. 1-6, 11-12.

Type material. Holotype, 26.7 mm, Mauretania, continental shelf, N. O. "N'diago" campagne 1981 stn. 85, 20°07'N, 17°38'W, 200 m, MNHN 9964. Paratype, 29.5 mm, R. V. "Président-Theodore-Tissier" cruise, dredged between Morocco and Senegal, MNHN 9965.

Type locality. Mauretania, continental shelf, N. O. "N'diago" campagne 1981 stn. 85, 20°07'N, 17°38'W, 200 m.

Range. Only known from the type material.

Description. Shell thin, fragile, up to 29.5 mm in length. Shape columbariiform, with broad, short spire, siphonal canal elongate. Aperture together with siphonal canal equal to or slightly longer than 2/3 of total shell length.
Protoconch big, rather papilliform, consisting of 2 1/2 smooth whorls, covered by minuscule holes. Diameter 1.3 mm, length: 1.6 mm. Transition to teleoconch abrupt, marked by a sharp edge.
Teleoconch consisting of 4 1/2 whorls. First 1/4 whorl well convex with 8 broad, weak, spiral cords, interspaces a fine groove. Remaining whorl suddenly becoming angulate, gradually stronger, forming a carina. Penultimate whorl with a second carina partly concealed under lower suture. Body whorl with 3 strong carinae which are ornamented with sharp axial lamellae and 12 smoother spiral cords of different strength on base and siphonal canal.
First 1/8 teleoconch whorl smooth, following 1/8 weakly waved. Further worls stringly knobbed on the carinae. Subsutural slope smooth, suprasutural part slightly waved.
Aperture round. Outer lip thin, simple, edge sharp. Columella smooth (holotype, subadult). Paratype with 2 small abapical columellar knobs, 1 small adapical columellar knob and some irregular lirae, columellar lip thin, sharp. Siphonal canal long, slender, open.
Operculum corneus, pale brown, ovate, nucleus terminal.
Animal and radula unknown.

Comparison. *Afer* (*Praecantafer*) *echinatus* sp. nov. is characterized by the columbariid shape with a long siphonal canal and a rather broad spire with sharp spiral cords and short spines.

Etymology. *Afer* (*Praecantafer*) *echinatus* sp. nov. is named after the Latin expression *echinatus* (adjective), meaning "with spines" or "spiny".

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Two Additions to the Fasciolariid Genus *Benimakia*

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KEYWORDS. Gastropoda, Fasciolariidae, Philippines, *Benimakia*, new species.

ABSTRACT. We describe *Benimakia cloveri* n. sp. from the Philippines, a species most closely related to *B. fastigium* (Reeve, 1847). Like *B. fastigium*, *B. cloveri* lacks a labral tooth, but *B. cloveri* is less slender. We recognize *Latirus rosadoi* Bozzetti, 2002, from Mozambique, as a labral-tooth-bearing species of *Benimakia* Habe, 1958. There are now three fossil and ten Recent species assigned to the genus *Benimakia*.

INTRODUCTION

The fasciolariid genus *Benimakia* Habe, 1958, is a largely Indo-West Pacific group of early Miocene to Recent fasciolariid gastropods with strongly ribbed, slender shells, a straight siphonal canal, and a lirate aperture. Most species bear a labral tooth at the end of a cord situated at the transition between the convex part of the last whorl and the siphonal protuberance (Vermeij and Snyder, 2003). The three fossil and eight Recent species recognized in Vermeij and Snyder (2003) range widely across the Indo-West Pacific from the coast of East Africa to the Marquesas Islands and, in the case of *B. ogum* (Petuch, 1979), on the Atlantic coast of Brazil. All species occur in the shallow sublittoral zone in reef areas; most have been collected in small numbers. Here we add to the known species by describing one new species and by reassigning a previously described taxon.

Abbreviations

ANSP: Academy of Natural Sciences of Philadelphia, Philadelphia, PA 19103, U.S.A.
SL: shell length

SYSTEMATICS

Family **FASCIOLARIIDAE** Gray, 1853
Genus ***Benimakia*** Habe, 1958
Type species by original designation: *Turbinella rhodostoma* Dunker, 1860; Recent, Indo-West Pacific.

***Benimakia cloveri*, n.sp.**
Figs 1-10

Type material. Holotype. ANSP 416225, 1 km northwest of Sinkton Cemetery, northwest coast of Camiguin Island, northwest Mindanao, Philippine Islands, live collected under rock slabs at 2-3 m, SL 32.9 mm.
Paratype 1. ANSP 416226, collected with holotype, SL 29.2 mm.
Paratypes 2-5. ANSP 416227, off Naasag, near old volcano, Camiguin Island, live collected in sand under rock/coral slabs at 2-3 m, (2) SL 33.1 mm, (3) SL 31.9 mm, (4) SL 29.6 mm, (5) SL 29.1 mm.
Paratype 6. Clover collection, collected with paratypes 2-5, SL 35.0 mm.
Paratypes 7-10. ANSP 416228, 5 km south of Yumbing, northwest coast of Camiguin Island, live collected under rock slabs at 2-3 m, (7) SL 31.8 mm, (8) SL 28.0 mm, (9) SL 28.3 mm, (10) SL 29.0 mm.

Type Locality. Northwest coast of Camiguin Island, northwest Mindanao, Philippine Islands, 1 km northwest of Sinkton Cemetery, on a substratum of sand and coral rubble, under rock slabs at a depth of 2-3 m.

Distribution. Northwest coast of Camiguin Island, northwest Mindanao, Philippine Islands, 2-3m.

Diagnosis. A relatively compact *Benimakia* with weakly convex outer lip lacking a labral tooth and having one weak columellar fold adapical to entrance fold of siphonal canal.

Description. Shell solid, medium-sized for genus, maximum length 35.0 mm. Protoconch of about three whorls. Teleoconch consisting of seven whorls separated by weakly impressed sutures; axial sculpture consisting of six to seven low, broad, rounded ribs, obliquely aligned up the spire; spiral sculpture eroded on all but the last three or four whorls, consisting of 20-21 weak, irregular cords from shoulder to upper end of constriction, with eight additional indistinct cords on the siphonal protuberance; outer lip finely crenulated, slightly convex, without abapical or adapical sinus and without labral tooth at edge; inner side of outer lip with nine or ten low, well-spaced, smooth lirae, and with small abapical tooth at position that would be occupied by a labral tooth were one present; inner lip adherent, with weak columellar fold adapical to entrance fold of siphonal canal; parietal rib at adapical end of inner lip absent; siphonal canal short (half or less of the length of the aperture), straight in the axial direction and not dorsally recurved. Exterior of shell creamy white to tan with chocolate brown spiral cords. Interior white to lustrous yellow in some specimens. Operculum typically fasciolariid, light to dark brown, with terminal nucleus. Radula not examined.

Remarks. Our new species from Mindanao is most similar to *B. fastigium* (Reeve, 1847) from Sri Lanka. Both species lack a labral tooth, have about 20-21 exceedingly fine cords on the shoulder and convex part of the last whorl, rounded whorls, a similar number (five to seven) of rounded axial ribs that join at the sutures, and a convex outer lip. *B. fastigium* differs from *B. cloveri* by having a much more slender shell (length to breadth ratio 2.7 to 3.0 in *B. fastigium*, 2.3 to 2.5 in *B.cloveri*) and having a less deeply impressed suture. *B. fastigium* has four small columellar folds adapical to the entrance fold, whereas *B. cloveri* has only one weak columellar fold.

Etymology. Named for Phillip W. Clover who collected all 11 specimens in 2005 and 2006.

Benimakia rosadoi, new combination

***Latirus rosadoi* Bozzetti, 2002**
Figs 11-12

Remarks. Bozzetti (2002) described *Latirus rosadoi* from Mozambique. Examination of specimens in the ANSP collection makes clear that this species belongs to the genus *Benimakia*. With its very weak but distinct labral tooth, the species closely resembles *B. rhodostoma* (type of the genus, originally described from Japan), as well as *B. delicata* Vermeij and Snyder, 2003, from Samoa; *B. lanceolata* (Reeve, 1847) from the Philippines and eastern Indian Ocean; *B. marquesana* (A. Adams, 1855) from the Marquesas Islands; and to a lesser extent the Brazilian *B. ogum*. Like *B. rhodostoma*, the species has three weak columellar folds adapical to the entrance fold. The shell of *B. rosadoi* is relatively squat (length to breadth ratio 2.1). *B. rhodostoma*, which may in the future be recognized as a complex of geographically isolated species (Vermeij and Snyder, 2003), has fewer stronger spiral cords, a longer labral tooth, and a generally somewhat more slender shell.

ACKNOWLEDGEMENTS

We acknowledge the help of Paul Callomon (ANSP) who made the digital images and composed the plate. The referee and editor also made helpful suggestions.

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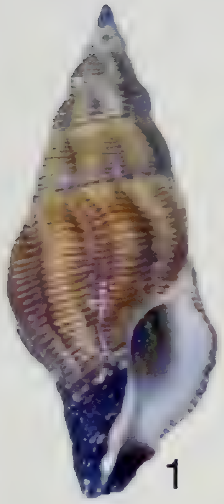
Bozzetti, L. 2002. Due nuove specie dal Mozambico (Gastropoda: Prosobranchia: Fasciolariidae). *Malacologia, Mostra Mondiale* 14(36): 3-4.

Vermeij, G.J. & M.A. Snyder. 2003. The fasciolariid gastropod genus *Benimakia*: new species and a discussion of Indo-Pacific genera in Brazil. *Proceedings of the Academy of Natural Sciences of Philadelphia* 153: 15-22.

Figures 1-12

1-10. *Benimakia cloveri* n. sp.

1-5. Holotype, SL 32.9 mm, ANSP 416225; **6-7.** Paratype 1, SL 29.2 mm, ANSP 416226; **8.** Paratype 2, SL 33.1 mm. ANSP 416227; **9.** Paratype 3, SL 31.9 mm, ANSP 416227; **10.** Paratype 6, SL 35.0 mm, Clover collection.
11-12. *Benimakia rosadoi* (Bozzetti, 2002), SL 26.9 mm, collected alive at 3-4 m, Pemba, north Mozambique, ANSP 416229.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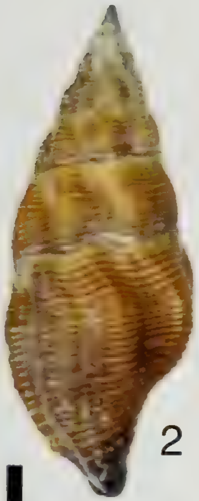
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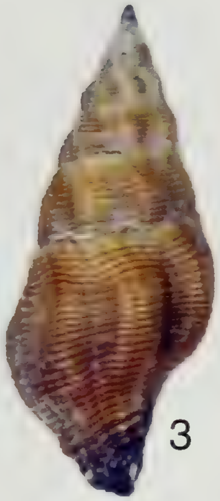
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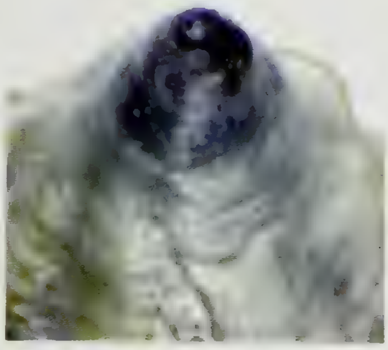
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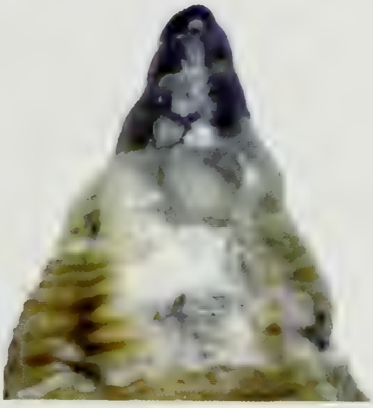
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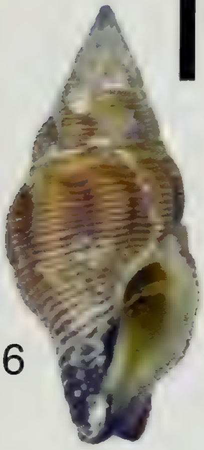
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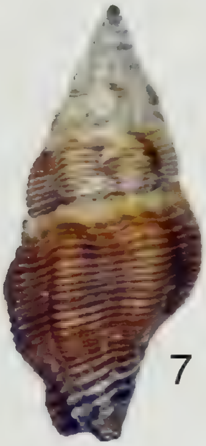
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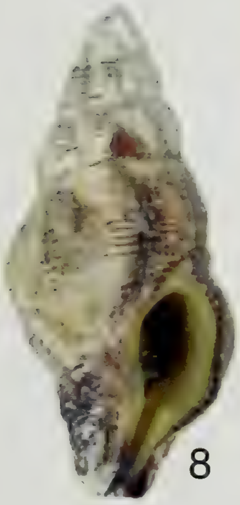
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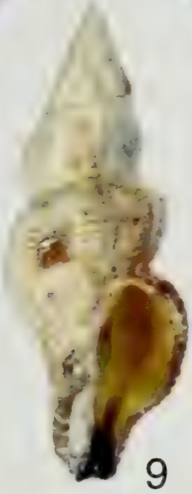
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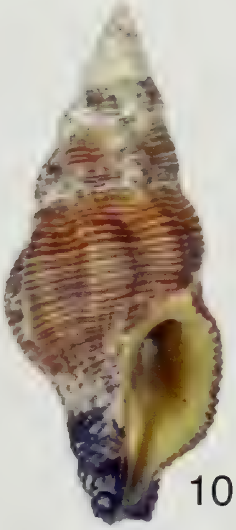
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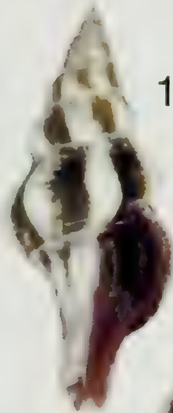
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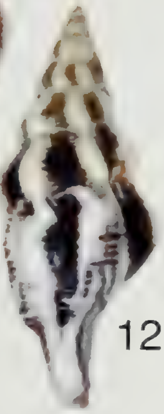
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Mayr, E. 1989. Attaching names to objects. In: *What the philosophy of biology is : essays for David Hull* (M. Ruse, ed.), Klumer Academic, Dordrecht: 235-243.

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Vie de la Société – Life of the Society

(suite)

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Claude VILVENS

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ATTENTION ! *Nos activités peuvent nous emmener dans diverses salles (particulièrement pour des projections ou des montages audio-visuels). Il ne nous est donc plus possible d'ouvrir les portes à distance après 15H.*

SAMEDI 12 AVRIL 2008

Christiane Delongueville et Roland Scaillet : Faune et paysages marins de Bretagne

Nos spécialistes de l'Europe vous convient à entreprendre une visite inhabituelle de l'étage infralittoral, émergé lors des marées de vive-eau, dans leurs stations préférées du littoral breton. Partez à la découverte d'un monde grouillant de vie dans lequel vertébrés et invertébrés cohabitent pour votre plus grand plaisir. Les amateurs de mollusques ne seront pas déçus et retrouveront leurs invertébrés favoris évoluant dans leur milieu naturel.

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SAMEDI 3 MAI 2008

Roland Houart : Les Muricidae - la sous-famille des Muricopsinae (suite)

Notre spécialiste amoureux des Muricidae nous propose cette fois les genres *Acanthotrophon* Hertlein & Strong, 1951 (4 espèces), *Bizetiella* Radwin & D'Attilio, 1972 (3 espèces) et surtout *Favartia* Jousseaume, 1880 (60 espèces).

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SAMEDI 31 MAI 2008

Tout le monde : L'excursion de printemps de la SBM.

Les beaux jours seront revenus et avec eux l'envie d'aller sur le terrain. Comme d'habitude, le choix de la zone que nous prospecterons n'est pas encore fixé – nous terminons à peine l'hiver et notre équipe de reconnaissance (= Claude et Etienne) va déterminer l'endroit au retour du printemps – nous envisageons la région de Couvin (Hainaut) mais sous toute réserve.

Comme d'habitude aussi, le plus simple pour obtenir les dernières informations est de consulter notre site Internet (http://users.swing.be/sw216502/ ou http://www.sbm.be.tf) ou encore de contacter quelques jours auparavant soit Claude (vilvens.claude@skynet.be ou 04/248.32.25), soit Roland (roland.houart@skynet.be ou 016/78.86.16). Comme d'habitude, il convient de prévoir d'emporter sa bonne humeur, un guide de détermination … et sans doute aussi bottes et vêtements de pluie (bien qu'en principe, le temps ne puisse être que magnifique ;-)).

***

Réservez déjà dans vos agendas le 21 juin 2008.

Pour les informations de dernière minute :

http://users.swing.be/sw216502/ ou http://www.sbm.be.tf

Novapex/Société : la publication généraliste de la SBM

Rédacteurs en chef : Claude Vilvens et Etienne Meuleman

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- texte de taille 10, titres de taille 12;
- interligne simple;
- toutes les marges à 2,5 cm;
- document en une seule section;
- pas de mode colonne;
- photos en version électronique JPG.

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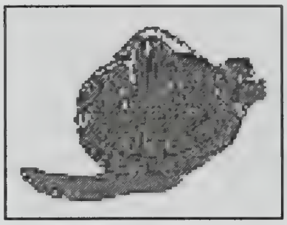

Colonisation des côtes de la République Turque de Chypre du Nord par un Muricidae originaire du golfe persique (*Ergalatax* Iredale, 1931)

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MOTS CLEFS: Mollusques, espèce invasive, Chypre du Nord, *Ergalatax sp.* (ex *Morula martensi* Dall, 1923).

KEY WORDS: Molluscs, invasive species, North Cyprus, *Ergalatax sp.* (ex *Morula martensi* Dall, 1923).

RÉSUMÉ

Ergalatax sp. (ex *Morula martensi* Dall, 1923) fut sporadiquement récolté en quelques endroits au sud de l'île de Chypre. Cette note rapporte les résultats d'un échantillonnage effectué en mai 2007 dans la péninsule de Karpas. Elle met en évidence l'existence d'une colonisation bien établie à ce jour dans la partie nord de Chypre. L'aire de distribution de cet *Ergalatax* couvre aujourd'hui l'ensemble du bassin nord-oriental et est de la Méditerranée.

ABSTRACT

Ergalatax sp. (ex *Morula martensi* Dall, 1923) was sporadically found in some places in the South of Cyprus Island. This note reports a sampling performed in May 2007 in the Karpas peninsula. It shows, at the present time, the presence of a strong settlement of this species in the North of Cyprus. The distribution area of this *Ergalatax* covers today the entire North-East and East area of the Mediterranean Sea.

INTRODUCTION

Ergalatax obscura Houart, 1996 est un Muricidae décrit de mer Rouge et du golfe d'Aden (Houart 1996). On l'a décrit comme ayant colonisé les côtes levantines de Méditerranée. Néanmoins, l'espèce d'*Ergalatax* que l'on trouve actuellement en Méditerranée orientale ne provient pas de mer Rouge mais bien du golfe persique (Houart: communication personnelle). Sa position taxonomique sera explicitée plus en détail par Houart (sous presse). Dans l'attente, nous utiliserons la dénomination *Ergalatax sp.* (ex *Morula martensi* Dall, 1923).

Cette espèce a été signalée pour la première fois en Méditerranée en 1992, à Taşucu, sur la côte orientale de Turquie (Engl 1995, Buzzurro et al 1995). Giunchi & Tisselli (1995) mentionnent la récolte de coquilles similaires à Burnaz, en 1993, dans le golfe d'Iskenderun. Dans une note consacrée aux mollusques de Chypre, Buzzurro & Greppi (1997) publient, une liste d'espèces lessepsiennes collectées sur les côtes chypriotes et sur celles de Taşucu, en Turquie. Dans cette publication, le lieu de récolte au sud de Chypre est Protaras - 1 mètre - sous les rochers (Buzzurro: communication personnelle). Zibrowius & Bitar (2003) font mention de récoltes au Liban (Batroun). Zenetos et al ([2003] 2004 - p. 114-115) rapportent la présence de ce Muricidae dans la baie de Larnaca. Singer (2005) fait mention de collectes réalisées le long des côtes israéliennes et Mienis (2006) en précise la profondeur (de 30 cm à 9 mètres de fond). Delongueville & Scaillet (2007 - Fig. 31) confirment que l'espèce est particulièrement abondante dans la région de Taşucu. Buzzurro a récemment collecté des spécimens à Agia Napa, au sud-est de Chypre (communication personnelle). D'autre lieux de récolte en Turquie sont mentionnés par le « Global Biodiversity Information Facility »: en 2002 à Kémer et en 2005 à l'est d'Alanya (stations situées dans la région d'Antalya) (GBIF 2008).

Nous avons effectué personnellement quelques récoltes de ce Muricidae (2002 et 2005) dans diverses stations le long de la côte orientale de Turquie et jusqu'à la frontière syrienne - localités: Liman Kalesi, Yumurtalik, Iskenderun, Yalikent, Gulcihan et Kale (Carte 1). Dans chacune de ces stations, les coquilles étaient présentes en grand nombre sur ou sous les rochers, à quelques décimètres de profondeur. Dans le golfe d'Iskenderun (Karatas et Yumurtalik), les pêcheurs ramènent dans les débris coralligènes des spécimens d'*Ergalatax sp.* (ex *Morula martensi* Dall, 1923) provenant d'eaux plus profondes, entre 10 et 40 mètres.

RÉCOLTES PERSONNELLES

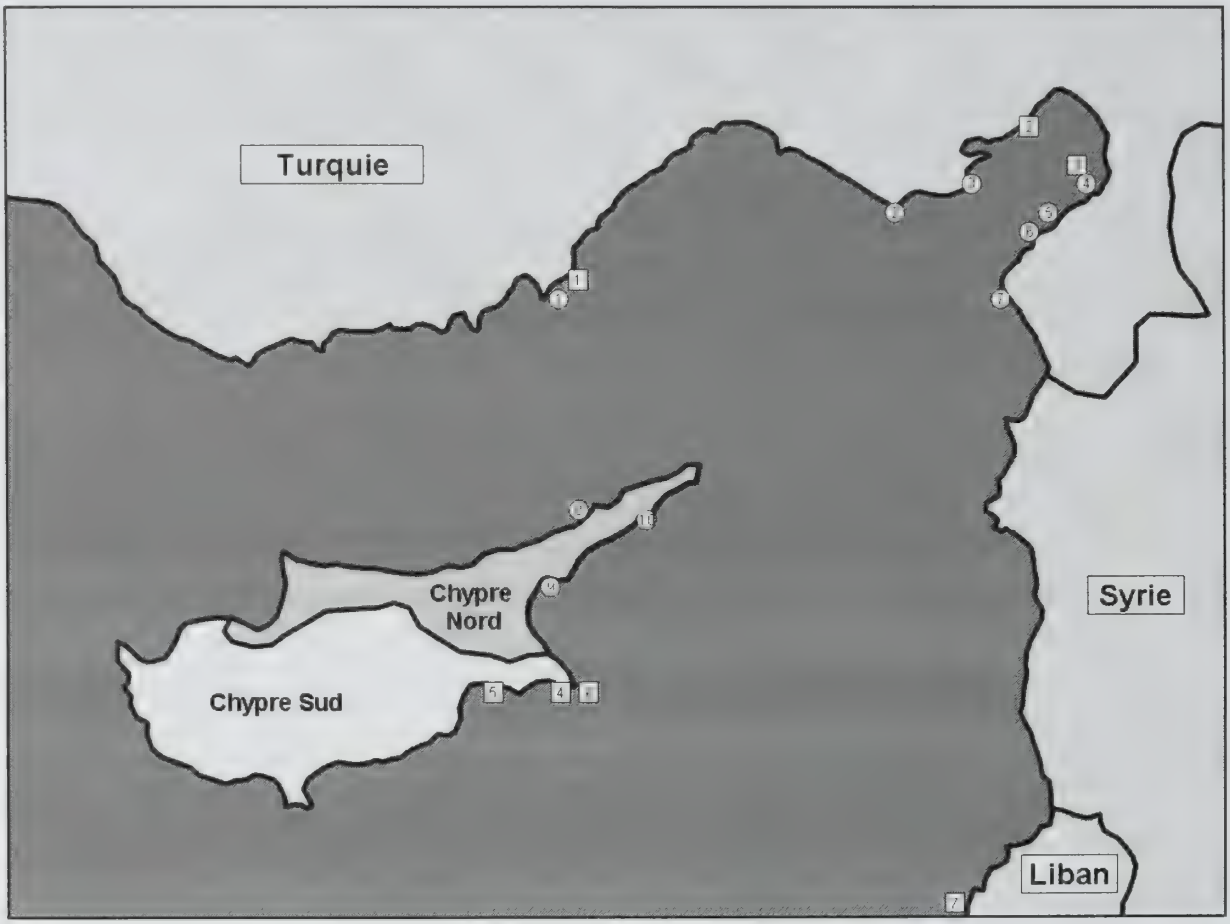
Lors d'un séjour dans la République Turque de Chypre du Nord, en mai 2007, de nombreux spécimens vivants d'*Ergalatax sp.* (ex *Morula martensi* Dall, 1923) ont été collectés en diverses localités, de part et d'autre de la péninsule de Karpas (Carte 1).

A Tatlisu, sur la côte Nord, à 1 mètre de profondeur, sur des blocs rocheux épars couverts d'algues se trouvaient des spécimens de cette espèce (Fig. 5).

A Bogaz, sur la côte Sud, la grève se prolonge en mer par une succession de petits blocs rocheux quasi solidaires les uns des autres et légèrement découverts par une marée de faible amplitude (quelques centimètres). La face inférieure de ces petits blocs est couverte de vie: ascidies, éponges, polyplacophores (*Chiton olivaceus* Spengler, 1797), mollusques fixés (*Vermetus triquetrus* Bivona Ant., 1832). Ça et là, des spécimens d'*Ergalatax sp.* accompagnés de *Columbella rustica* (Linnaeus, 1758) adhéraient au substrat (Fig. 1 à 4).

A Kaleburnu, à l'est de Bogaz, la côte est parsemée de chaussées rocheuses percées de rock-pools. En fin de marée basse, ceux-ci se peuplent d'une multitude de coquilles occupées par des pagures. Des dizaines d'espèces de gastéropodes sont représentées avec parmi celles-ci de nombreuses coquilles d'*Ergalatax sp.*

Dans chacune de ces stations de récolte, les spécimens d'*Ergalatax sp.* (ex *Morula martensi* Dall, 1923) étaient présents en très grand nombre.



Carte 1: détails de la côte nord-orientale de la Méditerranée

O: Récoltes personnelles	1. Liman Kalesi - 2. Karatas - 3. Yumurtalik - 4. Iskenderun - 5. Yalikent - 6. Gulcihan - 7. Kale - 8. Tatsilu - 9. Bogaz - 10. Kaleburnu.
: Données de la littérature et communications personnelles	1. Taşucu - 2. Burnaz - 3. Iskenderun - 4. Protaras - 5. Baie de Larnaca - 6. Agia Napa - 7. Batroun.

CONCLUSION

Après de sporadiques apparitions rapportées dans les années 90 en Méditerranée orientale (Turquie et sud de Chypre), *Ergalatax sp.* (ex *Morula martensi* Dall, 1923) est désormais confortablement installé dans le bassin oriental de la Méditerranée et, dans le cas qui nous occupe, le long des côtes de la République Turque de Chypre du Nord.

REMERCIEMENTS

Nous remercions Giovanni Buzzurro pour les informations concernant ses localités de récolte et Roland Houart pour la discussion à propos de la position taxonomique de l'espèce.

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LÉGENDES

***Ergalatax sp.* (ex *Morula martensi* Dall, 1923)**

Figure 1.	Bogaz (Chypre du Nord) - in situ	-
Figure 2.	Bogaz (Chypre du Nord) - vue ventrale	19,9 x 11,0 mm
Figure 3.	Bogaz (Chypre du Nord) - in situ	-
Figure 4.	Bogaz (Chypre du Nord) - vue dorsale	22,1 x 12,3 mm
Figure 5.	Tatsilu (Chypre du Nord) - vue ventrale	13,6 x 7,6 mm
Figure 6.	Yumurtalik (Golfe d'Iskenderun - Turquie) - vue ventrale	21,1 x 9,1 mm

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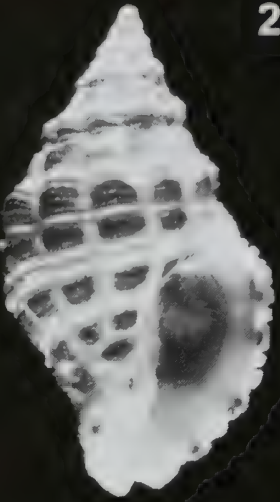
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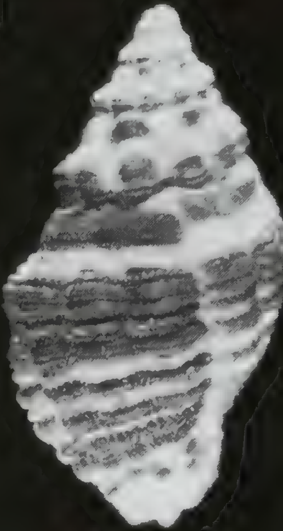
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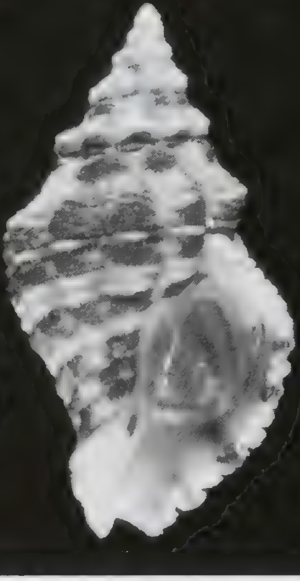
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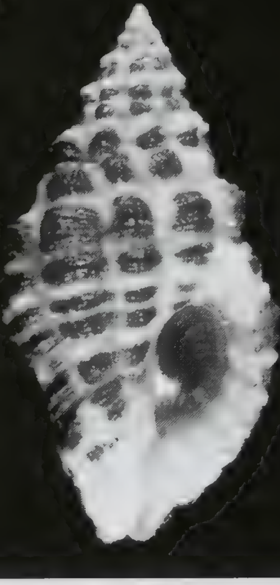
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L'Assemblée Générale de la Société Belge de Malacologie du 16 février 2008

Roland HOUART, Claude VILVENS, Etienne MEULEMAN et Annie LANGLEIT –
Photos : Christiane DELONGUEVILLE

Conformément aux statuts de la Société Belge de Malacologie, nous nous sommes réunis en Assemblée Générale le samedi 16 février 2008 pour analyser ce qui a été réalisé en 2007, pour aborder nos réalisations de 2008 et pour fixer les cotisations de 2009. Nous avons repris les différents thèmes suivants :

- Rapport moral, compte-rendu de nos excursions et de nos réunions, de nos publications: Novapex et Novapex/Société.
- Nous avons ensuite donné un aperçu du comité d'administration, de nos membres de notre site internet et de notre bibliothèque.
- Nous sommes passé ensuite au rapport financier (bilan de l'exercice 2007 et prévisions budgétaires pour 2008) et aux cotisations pour 2009.
- Nous avons clôturé la séance par les divers, par une tombola gratuite et par le drink de l'amitié.
- Le tout était soutenu grâce à une projection Power Point.

1. RAPPORT MORAL

1.1 Nos réunions

En 2007, nous nous sommes retrouvés 10 fois pour suivre des conférences ou pour d'autres réunions (atelier) et 2 fois au cours d'excursions.

- Le 13 janvier 2007 nous présentions la **21me exposition de coquillages** réalisée par les membres de la SBM, une manifestation devenue incontournable depuis de très nombreuses années. C'est toujours un plaisir de se rencontrer lors de cette manifestation et de voir ce que les autres ont exposés tout en y apportant soi-même sa petite ou sa grande contribution. Elle nous permet de montrer ce qui fait la fierté de notre collection et par la même occasion, nous pouvons ainsi admirer d'autres réalisations et d'autres coquillages. Comme nous le répétons tous les ans, l'existence de ces expositions nous a permis de contempler des centaines de coquilles appartenant à des dizaines de familles différentes; des livres; des objets fabriqués à partir de coquillages ou des artefacts de coquillages. Ces expos sont fidèlement relatées et illustrées dans Novapex/Société.
L'histoire de ces expos a débuté en 1986, pour fêter nos vingt ans d'existence. Notre but n'était pas d'en faire une habitude, mais de fil en aiguille et d'année en année nous nous sommes rendu compte du succès de ces expos et nous n'avons pas encore envie de nous arrêter.
- L'**Assemblée Générale** du 10 février nous a permis de faire le point sur ce qui avait bien ou moins bien fonctionné en 2006.

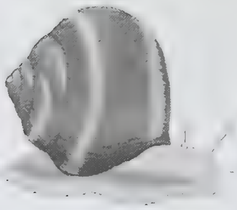
- Le 3 mars, **Annie Langleit** continuait son étude de la grande famille des **Tellinidae** en nous présentant la suite des genres appartenant à la sous-famille des Tellininae, ce qui nous a permis de découvrir quelques petites merveilles.
- Le 21 avril, **Etienne Meuleman** dans sa conférence intitulée "**L'usage de la coquille dans les arts premiers**" nous présenta quelques œuvres découlant directement de coquillages ou ayant des coquillages comme thème ou comme ornements.
- le 26 mai, **Kevin Monsecour** nous familiarisait avec les **Columbellidae** en nous détaillant la classification récente de cette très belle famille.
- Le samedi 23 juin nous eûmes le privilège d'entendre un orateur suisse, **Rolf Haubrichs**, venu spécialement chez nous pour nous présenter sa conférence intitulée sobrement: "**La pourpre**". Pourtant tout un programme.
- Le 8 septembre lors de la reprise de contact après les deux mois de vacances (pour certains) c'est **Claude Vilvens** qui pris la relève en nous présentant la **phylogénie actuelle des mollusques**. Il nous a fait voyager du cambrien aux temps actuels en nous narrant les diverses étapes supposées de l'évolution.

Après cette réunion, nous nous sommes retrouvés nombreux pour notre banquet annuel.

- Le samedi 13 octobre **Marc Alexandre**, aidé par son fils Kévin nous fit découvrir les **élevages d'escargots** qu'il a rencontré lors de ses séjours en France, en nous donnant un aperçu des parcs et des diverses espèces élevées en héliciculture.
- Le 10 novembre nous étions invités au **Groenland** par **Christiane Delongueville et Roland Scaillet**. Le Groenland, un territoire où les endroits abritant des mollusques sont malheureusement très difficiles d'accès et pour lequel la littérature spécialisée est quasi-inexistante, mais une île magnifique que Christiane a très bien illustrée par de splendides diapositives.
- L'année se termina le 15 décembre par un **atelier collectif**: les **documentaires télévisés sur les mollusques à destination du grand public**. Claude nous avait préparé quatre projections de documentaires proposé par la RTBF (le jardin extraordinaire) et par France 3 (C'est pas Sorcier).

… Et nous n'avons toujours pas changé d'avis : ces réunions sont une occasion de rencontre, mais elles nous offrent également l'opportunité d'échanger des idées, des nouvelles, des impressions, et de s'offrir le ou les coquillages recherchés grâce aux très sympathiques membres qui apportent des coquillages !
Merci à eux, et merci à tous ceux qui garnissent nos tables !

1.2 Nos excursions



Les excursions de la SBM sont nos activités pratiques privilégiées sur le terrain. Elles permettent d'apporter des évaluations ponctuelles la biodiversité des mollusques terrestres et dulcicoles de Belgique. Cette année, nous avons parcouru deux zones que Claude et Etienne connaissent avaient au préalable reconnues :

1) L'excursion de printemps du **12 mai 2007** nous a fait parcourir le Parc Naturel de la Burdinale et de la Mehaigne (province de Liège), qui regroupe les 4 communes de

Braives, Burdinne, Héron et Wanze et qui abrite une grande diversité de flore et de faune. En fait, il n'existe aucun relevé malacologique précis de cette région et il devenait donc urgent d'aller y voir de plus près. Deux sites furent prospectés consciencieusement.

Tout d'abord, le Bois Taille-Gueule situé près du centre pénitentiaire de Marneffe nous révéla des Terrestres, tant à coquilles que limaces, cependant jamais en très grand nombre : Clausiliidae, Zonitidae, Hygromiidae, Helicidae ainsi que *Succinea putris et Bradybaena fruticum.*

Ensuite, la Traversine à Moha le long de la voie de chemin de fer qui longe puis recoupe la Mehaigne. Outre d'inattendus *Bradybaena fruticum*, nous avons trouvé beaucoup de coquilles mortes dont *Sphyradium doliolum, Helicella itala* et surtout *Monacha cartusiana.*

2) L'excursion d'automne a eu lieu le **29 septembre** 2007 dans **la région d'Andenne** (province de Namur), plus précisément sur les bords de Meuse situés dans le triangle Andenne, Namêche et Faux-les-Tombes : Site 1 : Entre Andenne et Vezin, Site 2 : Sclaigneau (Vezin), Site 3 : Le long de la N942 au carrefour vers Thon et Site 4 : Sur la route en direction de Faulx-les-Tombes.

Cette zone quelque peu négligée par les dernières recherches s'est révélée intéressante, notamment pour de petites espèces comme *Cochlicopa lubrica*, *Vallonia costata*, *Vallonia pulchella*, *Pupilla muscorum* et *Vertigo pusilla.* Plus classiquement, Clausiliidae, Zonitidae, Hygromiidae et Helicidae furent nombreux au rendez-vous. Nous avons eu ainsi aussi la possibilité de voir et de photographier de nombreuses espèces vivantes en pleine activité : un bien beau spectacle !

1.3 Nos publications : Novapex

Quatre numéros, dont un numéro HORS SERIE et un double ont vu le jour. Comme les autres années les auteurs furent nombreux et variés :
Le Volume 7 de Novapex a totalisé **133 pages** pour les numéros ordinaires et **72 pages** pour le numéro Hors Série, soit un total général de 205 pages (en format A4 faut-il encore le préciser) (contre 147 en 2006). Le numéro Hors série de NOVAPEX était consacré aux *Calliotropis* de l'Indo-Pacifique avec la description de 30 nouvelles espèces et d'une nouvelle sous-espèce, par Claude Vilvens. Les numéros ordinaires ont rassemblés 16 articles des auteurs suivants: Tony McCleery, Andy Wakefield, Emilio Rolán, José Maria Hernández, Winfried Engl, Sandro Gori, Constantine Mifsud, Panayotis ovalis, Maurice Jay, Emilio Garcia, Christiane Delongueville, Roland Scaillet, Jacques Vidal, jan Johan Ter Poorten, Patrice Bail, Koen Fraussen, Yuri Kantor, Roland Hadorn, Jakov Prkić, Morena Tisselli, Luigi Giunchi, Bernard Landau, Franck Frydman, Carlos Da Silva, Franck Swinnen et vos serviteurs, Roland Houart et Claude Vilvens. Les familles abordées étaient variées comme d'habitude: **Cysticidae, Pandoridae, Muricidae, Chamidae, Haminoeidae, Triphoridae, Columbellidae, Cardiidae, Volutidae, Fasciolariidae, Pectinidae, Cassidae, Solariellidae, Calliostomatidae** et **Chilodontidae** se sont partagés les 133 pages des numéros ordinaires. En tout, pas moins de 49 nouvelles espèces, une nouvelle sous-espèce et un nouveau genre ont été décrits. Ces articles ont également comportés un total de 7 planches photos en couleur et de nombreuses planches noir et blanc.

1.4 Nos publications : Novapex/Societe

Sur un total de **171 pages** (170 en 2005, 175 en 2006) dans 4 fascicules, le magazine généraliste de la SBM nous a proposé

a) les **articles malacologiques originaux** suivants :

♦ C. Delongueville &R. Scaillet : Mollusques associés à un échantillon de bois immergé

♦ au sud-ouest de l'Islande

♦ C. Delongueville & R. Scaillet : Note sur la présence de Mercenaria mercenaria Linnaeus, 1758 en baie du Mont-Saint-Michel (France)

♦ C. Delongueville & R. Scaillet : Ocinebrellus inornatus (Ocenebra inornata) (Récluz, 1851) en baie du Mont-Saint-Michel (France)

♦ C. Delongueville & R. Scaillet : Sur les traces de Linné à Uppsala

et bien sûr

♦ C. Delongueville & R. Scaillet : Les marées de 2008

b) les **comptes-rendus** d'événements de la vie de la SBM

♦ R. Houart, C. Vilvens, A. Langleit & E. Meuleman : L'Assemblée Générale de la Société Belge de Malacologie du 10 février 2007

- C. Vilvens & R. Houart : L'exposition 2007 de la SBM : Au lendemain du 40ème anniversaire - avec les contributions de C. Delongueville, R Duchamps, R. Houart, A. Langleit, E. Meuleman, R.Scaillet, J. et R. Senders, S. Valtat, C. Vilvens, E. Waiengnier.
- C. Vilvens, S. Valtat & R. Houart : Le 40ème anniversaire de la Société Belge de Malacologie

c) **les articles ayant trait aux membres** de la société

- R. Houart : Visite chez notre ami Pierre Adrians, héliciculteur à Louvain-La-Neuve
- R. Houart : Jacques VIDAL (06.12.1926- 22.09.2006)

d) les **compte-rendus d'excurion**

- C. Vilvens : L'excursion de printemps de la S.B.M. dans le Parc Naturel de la Burdinale et de la Mehaigne (12 mai 2007)

Vous découvrirez dans le présent numéro

- E. Meuleman : L'excursion de la Société Belge de Malacologie dans la Région d'Andenne (29 septembre 2007)

e) les **rubriques habituelles** mais tellement importantes: "Prochaines activités" (l'agenda), "Quoi de neuf ?" (les annonces en tous genres), "Quelques nouvelles publications" (livres et articles non reçus à la bibliothèque), "Nous avons reçu" (relevé de toutes les publications malacologiques reçues à la bibliothèque), "Morceaux choisis" (relevés d'articles parus dans des revus non-malacologiques) et "L'écho des réunions". Pour ces derniers, intéressants parce que tout le monde y contribue et parce qu'ils reflètent le dynamisme de nos réunions, citons :

- A. Langleit : Sophie Valtat : Les Mollusques pélagiques
- E. Meuleman : Annie Langleit : Les Tellinidae (suite)
- A. Langleit : Kevin Monsecour : la famille des Columbellidae
- E. Meuleman : Rolf Aubrichs : La Pourpre.
- M. Alexandre : Claude Vilvens : La phylogénie actuelle des Mollusques
- C. Vilvens : Marc Alexandre : L'héliciculture

On peut donc constater que Novapex/Société 2007 a encore une fois été le fruit du travail de beaucoup de monde. Un grand merci à tous ! Mais inutile de dire que tous les articles à sujet malacologique sont les bienvenus ☺ !
Signalons enfin que Novapex/Société 2008 aura deux rédacteurs en chef au lieu d'un : Claude Vilvens accompagné d'Etienne Meuleman.

1.5 Conseil d'administration

Nous n'avons rien à ajouter à ce que nous mentionnons tous les ans au sujet du conseil d'administration.
Nous nous réunissons généralement après chaque réunion pour discuter de points importants concernant la vie de la Société:

- Le calendrier des prochaines activités
- La trésorerie
- Novapex et Novapex/Société
- Le site internet
- La bibliothèque

Et quelques points divers tels que:

- Les tarifs postaux, la publicité, les cotisations, la liste des membres, et mille autres choses…

On voudrait bien sûr encore une fois remercier ces travailleurs de l'ombre pour leurs prestations sur des sujets parfois peu attrayants et assez rébarbatifs, bien que nécessaires!
Comme tous les ans également, on voudrait encore vivement rappeler que toute personne désirant faire partie de ce comité est évidemment le bienvenu. Il n'y a pas de condition, sinon celle de faire partie de la Société en tant que membre ordinaire, et bien sûr, de passer par les élections. Il y a du travail pour tous …

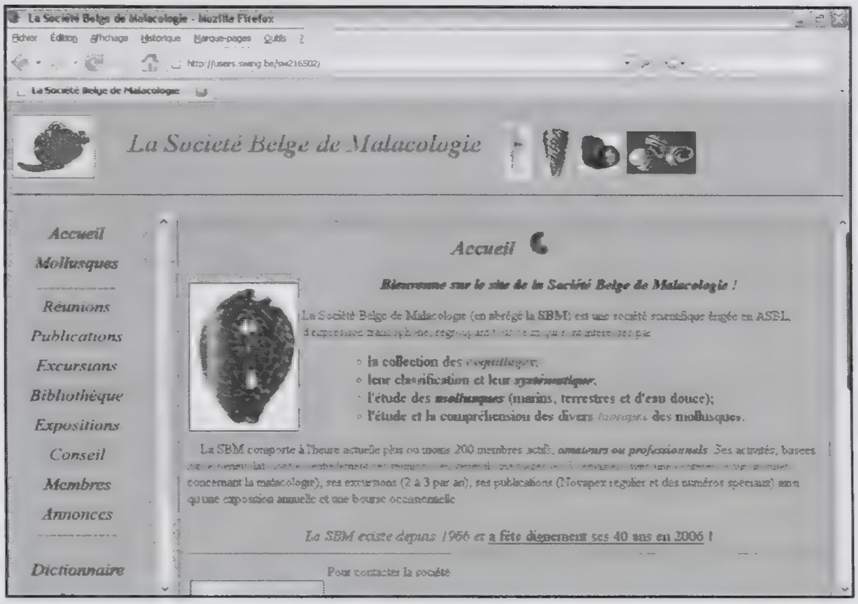
1.6 Les membres

Nous comptions 146 membres effectifs en ordre de cotisation pour 2007 (y compris les membres familiaux) dont une douzaine d'institutions. La répartition géographique était de 63 en Belgique, 47 en Europe et et le reste hors Europe.
Ces chiffres reflètent une stabilité devenue habituelle depuis des années. Les décès et non-renouvellements ont été comblés largement par 13 nouveaux membres en 2007.
Enfin, nous comptions 38 échanges en 2007.

1.7 Le site web

Notre site (**http://users.swing.be/sw216502/** ou **http://www.sbm.be.tf**) a conservé son look de fin 2006. Il reste surtout, avec sa **soixantaine de pages html** agrémentées de nombreuses photos :

- un **fournisseur d'informations, générales** (présentation de la SBM, de ses contacts, présentation de la malacologie, dates des grandes marées) et plus **pratiques** (agenda des réunions et excursions, annonce et informations pratiques pour les excursions, aspects divers de la vie de la société),
- une **référence didactique** (index des articles de Novapex depuis sa création – bientôt, le même outil sera disponible pour Novapex/Société, dictionnaire de malacologie en français, bibliographies de malacologues célèbres, description d'expéditions maritimes célèbres ainsi que nombreux liens utiles; notre site est cité comme référence Web dans de plus en plus d'ouvrages !


La Société Belge de Malacologie - Mozilla Firefox
Fichier Édition Affichage Historique Marque-pages Outils ?
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La Société Belge de Malacologie
La Société Belge de Malacologie
Accueil
Mollusques
Réunions
Publications
Excursions
Bibliothèque
Expositions
Conseil
Membres
Annonces
Dictionnaire

Accueil

Bienvenue sur le site de la Société Belge de Malacologie !

La Société Belge de Malacologie (en abrégé la SBM) est une société scientifique érigée en ASBL, [illegible]

- la collection des coquillages;
- leur classification et leur systématique;
- l'étude des mollusques (marins, terrestres et d'eau douce);
- l'étude et la compréhension des divers [illegible] des mollusques.

La SBM comporte à l'heure actuelle plus ou moins 200 membres actifs, *amateurs ou professionnels*. Ses activités, basées [illegible] concernant la malacologie), ses excursions (2 à 3 par an), ses publications (Novapex régulier et des numéros spéciaux) ainsi qu'une exposition annuelle et une bourse occasionnelle

La SBM existe depuis 1966 et a fêté dignement ses 40 ans en 2006 !

Pour contacter la société

1.8 La bibliothèque

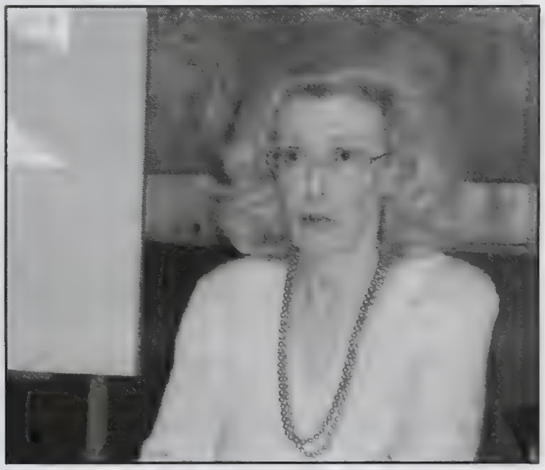
La bibliothèque poursuit son petit bonhomme de chemin… Elle se porte bien. Elle s'enrichit régulièrement de nouvelles revues du monde entier et de publications diverses. Elle reçoit aussi des articles glanés çà et là dans diverses revues scientifiques sur le thème des mollusques.

Certains membres empruntent régulièrement des revues sur des sujets divers (familles, origines,….). D'autres profitent du service de copie d'articles et reçoivent directement chez eux les articles désirés (moyennant un petit délai).

La bibliothèque possède aussi une base de données accessible à tous sur simple demande (fiches + CD Rom). Les fiches peuvent être consultées lors des réunions. Le CD Rom est disponible pour tous moyennant une petite contribution financière.

Pour rappel la bibliothèque possède également des nombreux ouvrages consultables lors des réunions ou empruntables.

2. RAPPORT FINANCIER



2.1 Le bilan 2007

Solde créditeur au 1er janvier 2007	18.457,58 €	
Cotisations	5.718,19 €	
Vente publications	1.279,14 €	
Tirés-à-part	81,16 €	
Dons anonymes	364,00 €	
Intérêts fond de roulement	228,33 €	
Subsides Région Wallonne	1.000,00 €	
Frais de publication		5.835,37 €
Frais d'expédition		2.188,57 €
Location salle		173,60 €
Location boîte postale		60,00 €
Abonnements aux revues		312,97 €
Gestion Banque de la Poste		25,00 €
Divers		95,00 €
Totaux	27.128,30 €	8.690,51 €
Solde créditeur au 31 décembre 2007		18.437,79 €
Total général		27.128,30 €

2.2 Les prévisions 2008

Solde créditeur au 1er janvier 2008	18.437,79 €	
Cotisations	5.600,00 €	
Frais de publication		8.800,00 €
Frais d'expédition		2.500,00 €
Location salle		86,80 €
Location boîte postale		60,00 €
Abonnements aux revues		320,00 €
Gestion Banque de la Poste		35,00 €
Divers		250,00 €
Totaux	24.037,79 €	12.051,80 €
Solde créditeur au 31 décembre 2008		11.985,99 €
Total général		24.037,79 €

3. ELECTIONS

Un administrateur, Claude Vilvens, était arrivé au terme de son mandat (pour rappel celui-ci est de quatre ans) et était rééligible. Nous avons reçu sa demande de réélection. Nous n'avons pas reçu de nouvelles demandes. Claude Vilvens a été réélu à l'unanimité.

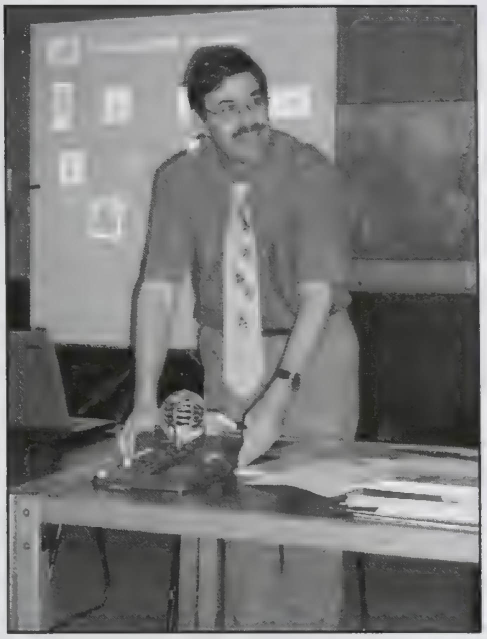
4. COTISATIONS 2009

Les cotisations sont restées inchangées depuis janvier 2003. Pendant 6 ans les membres habitant la Belgique auront donc payé 35 euros et les membres habitant l'étranger 50 euros. En 6 ans pourtant nous en aurons connu des améliorations et des planches couleurs supplémentaires et de meilleures qualités. Les factures de l'imprimeur ont ipso-facto été revues à la hausse.

Pourtant, et ceci en partie grâce au subside alloué par le Lotto et la région wallonne d'abord, ensuite par la région wallonne seule, nous n'avons pas dû augmenter la cotisation. La balance de nos entrées et de nos dépenses est restée plus ou moins en équilibre pendant ces 6 ans.
Malheureusement l'année dernière a encore vu une augmentation drastique des frais d'envoi et les frais de publications ont légèrement augmentés.
Nous avons donc proposé une légère augmentation de 5 euros pour les cotisations et les abonnements, soit 40 euros (au lieu de 35) pour la Belgique et 55 euros (au lieu de 50) pour l'étranger à partir de janvier 2009
Après un vote à main levée **la proposition a été adoptée à l'unanimité** par les membres présents.

5. DIVERS

C'est devenu une tradition : l'AG se termine par un petit cadeau pour tous les membres présents. Cette année, nous avons laissé la hasard choisir …



Une tombola gratuite
Nous avons donc voulu clôturer cette assemblée générale par quelques cadeaux, ceci afin de vous remercier de nous avoir accompagnés tout au long de cette année 2007. Nous espérons que les surprises auront été agréables.
Nous avons pensé qu'offrir un abonnement gratuit pour 2008 à diverses revues internationales était un cadeau très appréciable. Après avoir lancé quelques mails au 4 coins du monde, Nous avons reçu 10 réponses positives. Deux messages sont malheureusement restés sans suite, mais le résultat dépassait largement nos espérances.
Nous remercions très sincèrement les sociétés qui nous ont accordés ces abonnements gratuits, à savoir:

Gloria Maris (Belgische Vereniging voor Conchyliologie)
The Strandloper (Conchological Society of Southern Africa)
Triton (Israel Malacological Society)
Journal of Conchology et Mollusc World (Conchological Society of Great Britain & Ireland)
The Festivus (San Diego Shell Club)
Xenophora (Association Française de Conchyliologie)
American Conchologists (Conchologists of America)
Basteria et Spirula (Nederlandse Malacologische Vereniging)
Bolletino Malacologico et Notizario S.I.M (Societa Italiana di Malacologia)
Visaya (Philippines)
et bien sûr
Novapex et Novapex/Société (Société Belge de Malacologie)

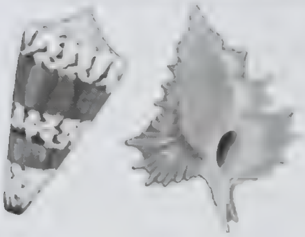
Nous remercions également Mme Simone Maenhout qui nous a offert un très joli ***Pecten maximus*** de sa fabrication comme autre lot pour cette tombola.

Treize heureux gagnants se sont partagés ces lots. Les autres membres présents recevront un lot surprise dans deux ou trois mois, puisqu'il est de coutume que tous les membres participants à notre Assemblée Générale reçoivent un petit cadeau d'amitié et de remerciement pour leur présence très appréciée lors de nos réunions.

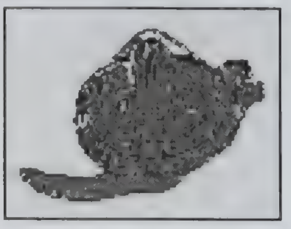
Comme tous les ans également, l'AG s'est terminée par le verre de l'amitié !

Une séance du conseil d'administration s'est ensuite tenue pour élire en son sein Président, vice-président, secrétaire et trésorier.
Au cours de cette séance des modifications sont intervenues au sein du conseil d'administration. Le poste de secrétaire sera dorénavant occupé par Mme Annie LANGLEIT, Av. Cicéron, 27, bte 92, 1140 Bruxelles, tandis que celui de trésorier sera occupé par M. Marc ALEXANDRE, rue de la Libération, 45, 6182 Souvret.
Les postes de président et vice-président restent inchangés, à savoir, occupés respectivement par M. Roland HOUART et M. Claude VILVENS.

MERCI A TOUS d'être venu nous soutenir lors de cette Assemblée Générale! Nous espérons vous revoir très souvent lors de nos prochaines activités !



L'exposition 2008 de la SBM



Etienne MEULEMAN –
Photos: Roland HOUART et Etienne MEULEMAN

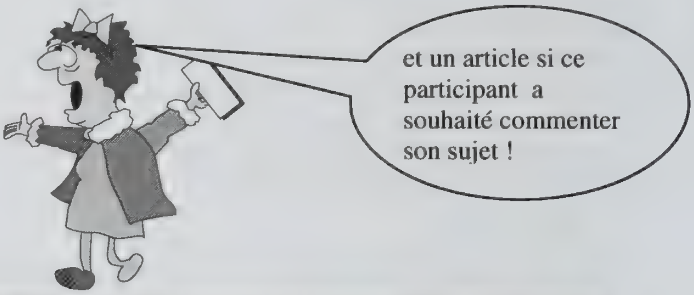
Avec les contributions écrites de Marc ALEXANDRE, Christiane DELONGUEVILLE, Ralph DUCHAMPS, Koen FRAUSSEN, Etienne LEURQUIN, Etienne MEULEMAN, Roland SCAILLET, Claude VILVENS et Edgar WAIENGNIER

La première réunion de l'année de la Société Belge de Malacologie a été consacrée ce **12 janvier 2008** à son Exposition : ses membres ont présenté quelques coquilles intéressantes de leur collection et les ont commentés avec passion et originalité.

Pour rappel, l'Exposition est destinée à tout le monde et tout le monde est donc le bienvenu.

Comme chaque année, nous allons relater les divers thèmes abordés. Je vous invite à suivre le guide et à vous laisser emporter par la douce musique des coquillages. En voiture !

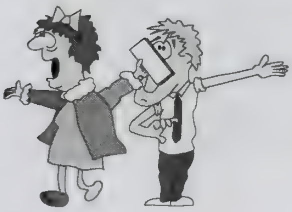
Pour chaque participant, des photos …


et un article si ce participant a souhaité commenter son sujet !

Expo 2008

Chamidae en Méditerranée

Christiane DELONGUEVILLE & Roland SCAILLET



En Méditerranée, la famille des Chamidae (bivalves de l'ordre des Veneroida) ne compte que peu de représentants. Ils sont au nombre de huit, répartis en deux genres : *Chama* Linnaeus, 1758 et *Pseudochama* Odhner, 1917. Ces bivalves ont en commun la caractéristique d'être solidement fixés au substrat (pierres, formations coralligènes, autres coquilles ou débris divers immergés) par une de leurs valves : celle de gauche pour le genre *Chama* et celle de droite pour le genre *Pseudochama*.

Les espèces natives de Méditerranée comprennent trois représentants : *Chama circinata* Monterosato, 1878, *Chama gryphoides* Linnaeus, 1758 et *Pseudochama gryphina* (Lamarck, 1819). Les deux espèces de *Chama* sont morphologiquement très proches l'une de l'autre. Elles se différencient par la forme des lamelles présentes sur leur valve supérieure : lamelles épineuses imbriquées pour *C. gryphoides* et lamelles arrondies distinctes pour *C. circinata.* Cependant, la variabilité de l'ornementation de ces coquilles est telle qu'il n'est pas toujours aisé de les différencier. Certains auteurs suggèrent de placer les deux espèces en synonymie bien que *C. circinata* provienne de zones plus profondes que *C. gryphoides*. Dans cette hypothèse, il pourrait alors s'agir d'écotypes différents. Sur la valve supérieure, l'umbo de *Chama circinata* et de *Chama gryphoides* est orienté de gauche vers droite, alors que celui de *Pseudochama gryphina* est orienté de droite vers gauche. L'identification de cette dernière espèce est donc aisée.

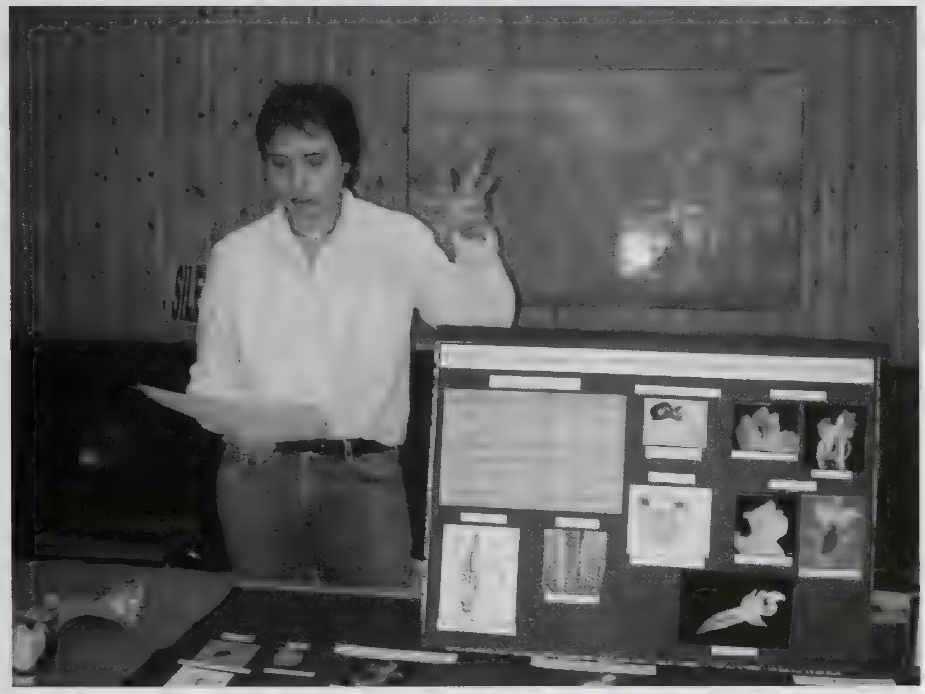
Cinq espèces provenant de mer Rouge se sont introduites en Méditerranée orientale après avoir franchi le canal de Suez. *Chama pacifica* Broderip, 1834 se multiplie actuellement de façon abondante le long des côtes levantines et dans le golfe d'Iskenderun. Les coquilles des spécimens adultes sont épaisses, atteignent jusqu'à 8 cm de longueur et sont beaucoup plus grandes que celles des espèces natives de Méditerranée qui ne dépassent guère 3 à 4 cm. *Pseudochama corbieri* (Jonas, 1846) ne fait l'objet que de rares citations : l'une en Attique - Grèce (1946) et l'autre sur une plage d'Israël (1972). Son implantation en Méditerranée semble être moins réussie que celle de *Chama pacifica*. Une valve inférieure est représentée dans l'atlas des espèces exotiques de mollusques présents en Méditerranée édité par le CIESM. *Chama aspera* Reeve, 1846 a été collectée à plusieurs reprises le long des côtes d'Israël et de Turquie. Quant aux deux autres, *Chama asperella* Lamarck, 1819 et *Chama brassica* Reeve, 1846, elles font l'objet d'une observation unique sur les piliers d'une plateforme de production de gaz au large d'Ashqelon (Israël).

En conclusion, voici donc encore une famille de mollusques dont le nombre de représentants en Méditerranée s'étoffe par le fait des migrations lessepsiennes résultant de l'ouverture du canal de Suez, il y a près de 140 ans déjà.

Expo 2008

Complexité et spécialisation des organes servant à l'alimentation chez les Gymnosomes

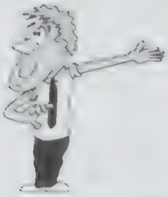
Sophie VALTAT



Expo 2008

Mes mollusques terrestres et dulcicoles

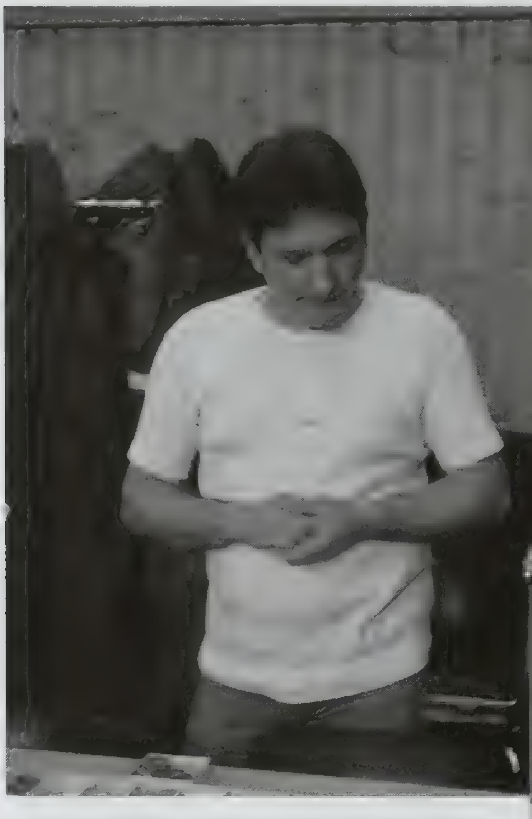
Marc Alexandre



Loin des magnifiques présentations élaborées de main de maître par nos amis membres qui étaient également présents lors de cette exposition, j'ai voulu simplement vous faire partager le plaisir que j'ai à rassembler petit à petit cette modeste collection de coquilles terrestres et de dulcicoles.

Résultat d'échange avec un ami et de récoltes personnelles cette collection s'agrandit d'année en année, surtout lors des magnifiques excursions organisées par notre ASBL ou à chaque fois nous retrouvons gaîté et bonne humeur, mais aussi acquérir certaines connaissances sur notre superbe patrimoine.

Je vous invite d'ailleurs à venir nombreux nous accompagner lors de ces excursions qui je suis sûr ne vous laisseront jamais indifférents. Merci à tous de votre attention.



Expo 2008

Les Buccinidae d'Antartique

Koen Fraussen

Les Buccinidae, bien connus par des grands coquillages d'eau froide de la région Arctique, sont également présent dans la région Antarctique.

Cent-vingt espèces appartenant à la faune (sub-) Antarctique sont connues. Ils ont une coquille principalement blanches; la plupart ont une taille adulte assez petite, de quelques millimètres jusqu' à 2cm. Par contre, je vous présente ici quatre exemplaires de grande taille:

Neobuccinum eatoni (E. A. Smith, 1875) est circum-Antarctique, assez commun sur fonds vaseux entre 4 et 2000mètres de profondeur, de nombreux exemplaires ont trouvé le chemin des collections privées. Cette espèce est variable, de ma collection je vous montre deux formes: des individus coniques et longs ou épais avec une spire moins haute.

La coquille ressemble à certains *Buccinum*, un genre exclusivement Arctique.

Antarctoneptunea aurora (Hedley, 1916) est très rare et ressemble superficiellement à certains *Neptunea* species (aussi un genre exclusivement Arctique).

Chlanificula thielei Powell, 1958, avec moins que 10 exemplaires connus, est vraiment une espèce mystérieuse. La forme est assez spéciale et ressemble plus à un objet volant non identifié extra terrestre qu'à un buccin. En plus, l'opercule est triangulaire avec 3 plis fortement marqués.

Les genres *Neobuccinum* E. A. Smith, 1875; *Antarctoneptunea* Dell, 1972 et *Chlanificula* Powell, 1958 sont monotypiques, donc les trois espèces précédentes sont le seul membre du genre.

Chlanidota (*Pfefferia*) *chordata* Strebel, 1908, endémique pour les Iles South Georgia, possède une sculpture spirale splendide et ressemble fort au genre Ancistrolepis (aussi un genre exclusivement Arctique).

Les coquillages présentés ici ont été trouvés par des pêcheurs dans leurs filets de dragues. La région Antarctique est fort protégée, il est donc très difficile de collectionner ces coquilles.

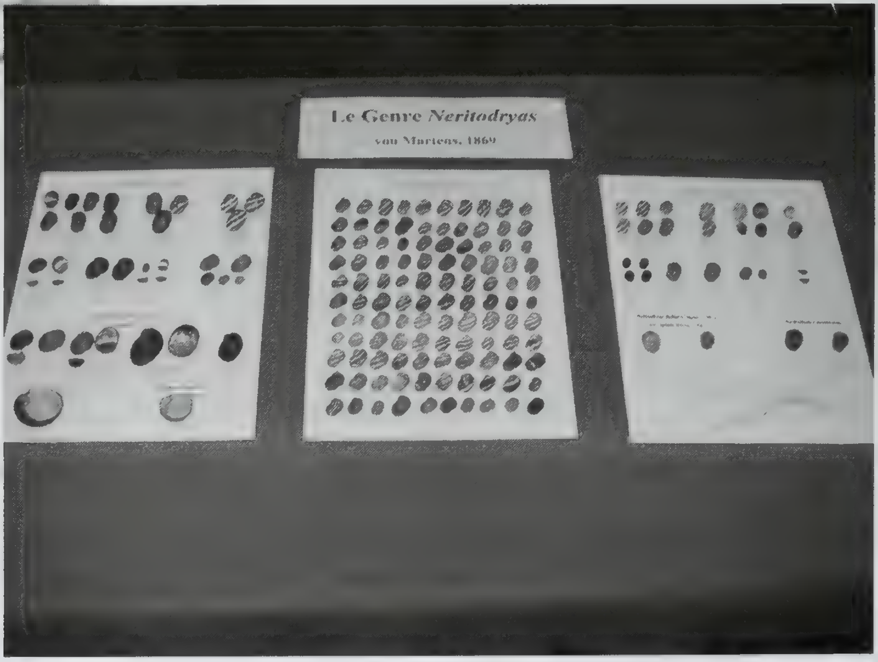
Expo 2008

Le genre *Neritodryas* von Martens 1869

Ralph Duchamps

Ce genre est peu connu, voire inconnu de pas mal de malacologues ou simples collectionneurs. Il nous est apparu dans des collections ou dans des listes de vente sous la dénomination de « *Natica* », « *Helix* » ou « *Nerita* ». Et il était donc intéressant de faire la lumière

Voir article complet p.34



Expo 2008

Évocation du mystère de Noël avec des coquillages

Etienne Leurquin

Les coquillages font partie du bestiaire du Christ comme ils ont été depuis les temps anciens des symboles mythologiques. Réel bonheur est le savoir-faire artistique utilisant les coquilles nacrières en les gravant et en les sculptant et parcourir la thématique de l'Avent, de la Noël et du temps de la révélation.

Cheminement populaire, ces nacres sculptées appelées pentadines (*Pinctada maxima*, *Pinctada margaritifera*) proviennent des ateliers de Bethléem, à destination tant orthodoxe qu'occidentale. Brillance attirant petits et grands, ces coquilles-tableaux ont depuis la fin du XVIIème siècle supplanté les ivoires, plus respectueuses aussi de l'écologie. Mais restons de bons gestionnaires de la nature qui nous a été donnée gratuitement. C'est un vouloir et un agir démocratique de se soucier de la création évolutive de Dieu.

La coquille-Saint-Jacques, la grande pélerine (*Pecten maxima*) et sa petite *sœur (Pecten jacobeus*) nous guideront pour partir sur la plage en esprit d'enfance mais revenir avec des trésors de spiritualité des eaux profondes. Conchyliologie et malacologie ainsi que spiritualités sont passions généreuses ; nous le savons bien ! La nacre par son irisation naturelle symbolise la transcendance de Dieu. La coquille-Saint-Jacques symbolise la main du Père nous délivrant ses bienfaits. Pecten (peigne et donc chevelure) est signe de fécondité agricole (herbe et blé) dans la mythologie ancienne ; Marie-Madeleine essuyant avec ses cheveux le parfum répandu sur les pieds de Jésus est accueil du Vivant et préfiguration de l'embaumement du Christ. Toutes ces pintadines émaillent les grandes fêtes de ce cycle liturgique. L'homélie des messes complétera, approfondira notre cheminement de découvertes. Chaque coquille ou montage d'objets nous font passer du profane au sacré, partages humains solidaires revivifiés.

Exposition par association d'idées et, par exemple, passer de l'œuf en nacre à broder à la boule de Noël dont elle tire son origine. C'est alors le moment de montrer que les « boîtiers » de chapelets de nacre sont extraits d'autres coquilles nacrières (*Turbo marmoratus*) ou que le *Trochus niloticus* a servi malgré sa forme et sa complexité à la fabrication de boutons. Ceci nous a porté vers une prière de conviction et de foi : « les boutons de nacre de notre vie s'enfilent comme paroles humaines et divines ». Parfois nous avons pu migrer d'un objet à un concept spirituel jusqu'à évoquer un engagement concret : le pèlerin de la coquille Saint-Jacques jusqu'à la croix en nacre de Jésus ; beauté évocatrice des objets pour conduire vers le mystère de la fécondité convertie, de la re-naissance rédemptrice, cette vraie gloire du Christ, notre espérance. Alors ces coquillages deviennent comme des paroles entendues et, pour nous, acquièrent un sens nouveau, supplémentaire, plénier, selon le regard libre de chacun.

N.B. Cette même exposition a eu lieu en la cathédrale de Bruxelles (2007)

Expo 2008

Quelques belles porcelaines…

Georges Vauquelin

Expo 2008

Le genre Rapana

Roland Houart

Voir article complet p.38

Le genre *Rapana* est représenté par trois espèces récentes, totalisant quand même 11 noms, dont 8 sont des synonymes plus récents (voir article dans ce numéro).

La coquille des *Rapana* est généralement volumineuse, atteignant parfois plus de 20 cm. Elle est ornée de nombreuses lamelles axiales ou de varices et de nombreux cordons spiraux.

L'ouverture est large et protégée par un opercule. Le canal siphonal est court, très large avec un ombilic très prononcé.

Deux autres genres sont parfois confondus avec le genre *Rapana*: le genre *Neorapana* Cooke, 1918, un autre genre des Rapaninae et *Rapa* Bruguière, 1792, un Coralliophilinae (autre sous-famille des Muricidae).

Rapana bezoar (Linnaeus, 1767) est la plus petite des trois espèces. Elle vit principalement au nord-ouest de l'Océan Pacifique (Japon, Chine,Vietnam,Taiwan).

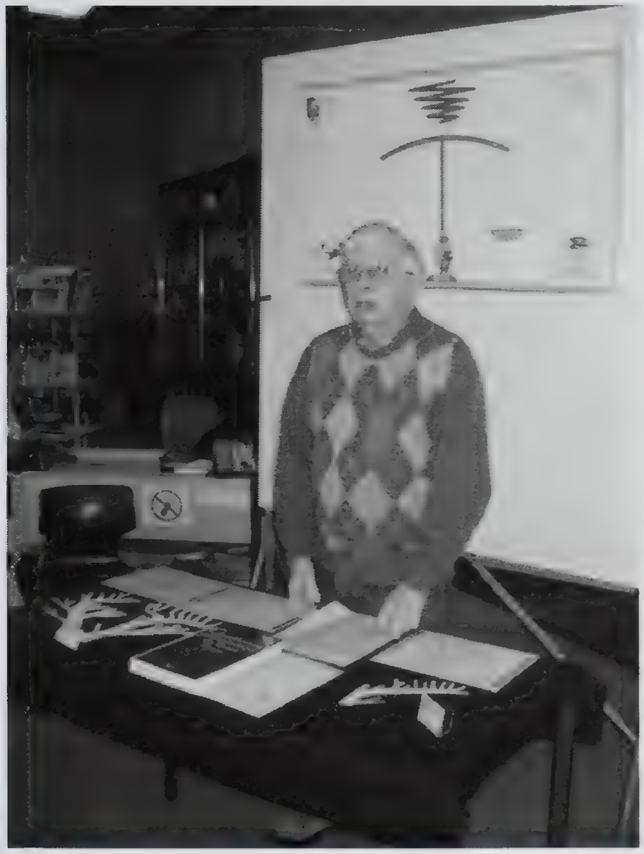
Rapana rapiformis (Born, 1778), avec sa large ouverture, sa spire assez basse et son large canal siphonal est très reconnaissable parmi les *Rapana* et parmi toutes les espèces peuplant son aire de distribution. Sa taille moyenne varie entre 90 et 120 mm Son aire de répartition dans l'Indo-Pacifique est beaucoup plus étendue que celle de ses deux congénères.

Rapana venosa (Valenciennes, 1846) est la plus connue et la plus commune des *Rapana*. L'ouverture est très large, de couleur orange clair à orange vif sur le bord columellaire et sur le bord interne de la lèvre externe. La coquille elle-même est brune avec des cordons spiraux parsemés de taches plus foncées. La taille moyenne de la coquille de *R. venosa* varie entre 90 et 120 mm de haut, mais elle peut dépasser les 20 cm. Son aire de répartition originale se limite au nord-ouest de l'Océan Pacifique, soit le Japon, la Corée, les côtes chinoises et Taiwan, mais elle envahit peu à peu toutes les régions du globe (voir plus loin).

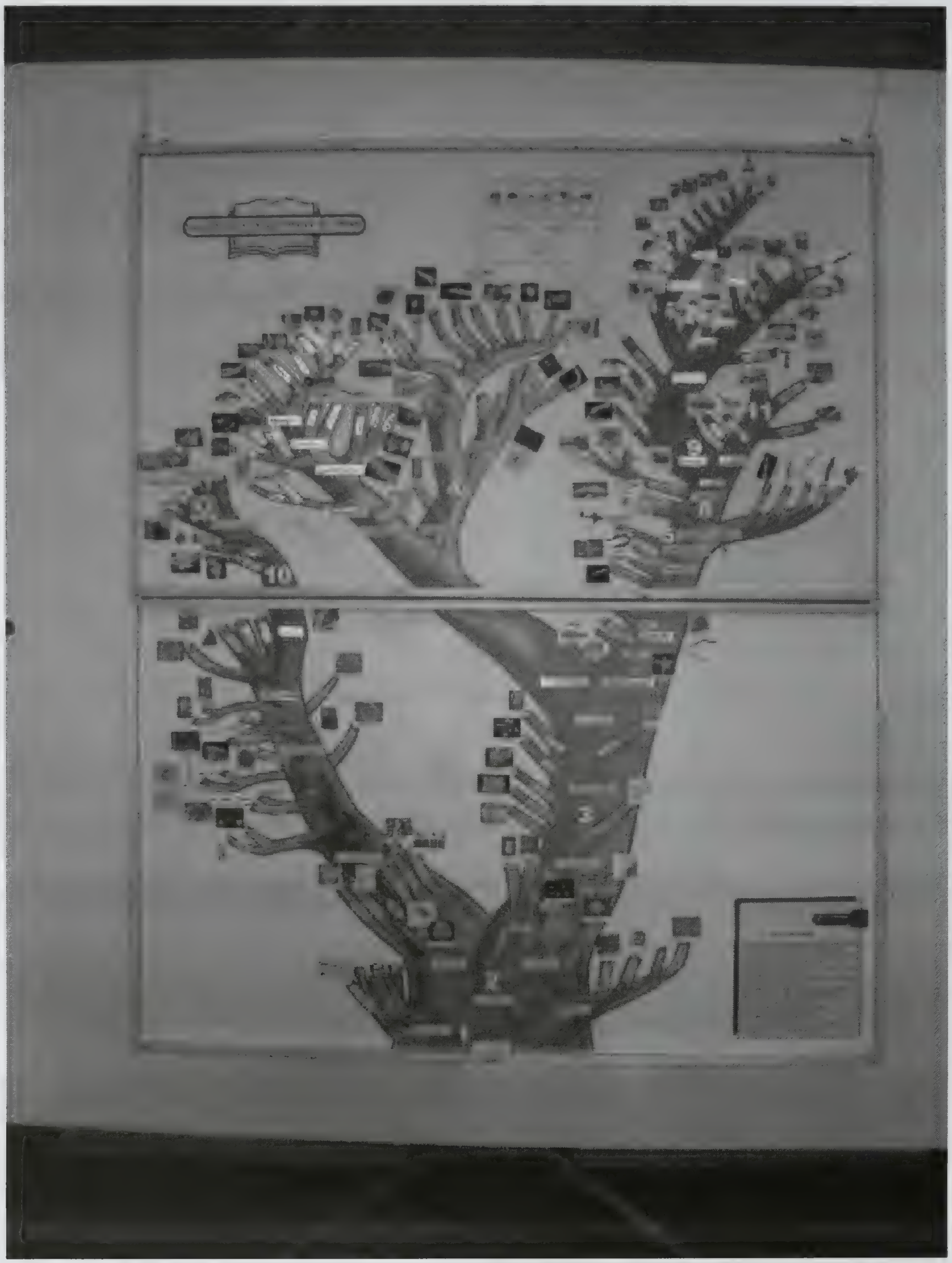
Expo 2008

Auprès de mon arbre…

Edgar Waiengnier



Auprès de mon arbre, je vivais heureux... On connaît la suite ! Dommage pour Georges, mais le mien, le vôtre, le NOTRE, est bien vivant !
Pour un arbre, vivre, c'est aussi remplacer les branches "mortes" et faire de nouveaux "bourgeons". C'est-à-dire, "évoluer" !
La publication de la "*Classification phylogénétique du vivant"* de **Guillaume Lecointre** & **Hervé Le Guyader**, a donné à Edgar l'occasion de "tailler" le nouvel arbre. Simplifié, certes, mais illustrant parfaitement les nouvelles tendances de la phylogénie moderne.
Avec deux exemples à l'opposé l'un de l'autre: les **Hominoïdes** (bourgeon) et les **Myxinoïdes** (greffon ?), il a montré que l'arbre était toujours bien "vivant" !
Plus de 160 organismes, "typiques", étaient « branchés ». C'était un bel arbre de vie !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Expo 2008

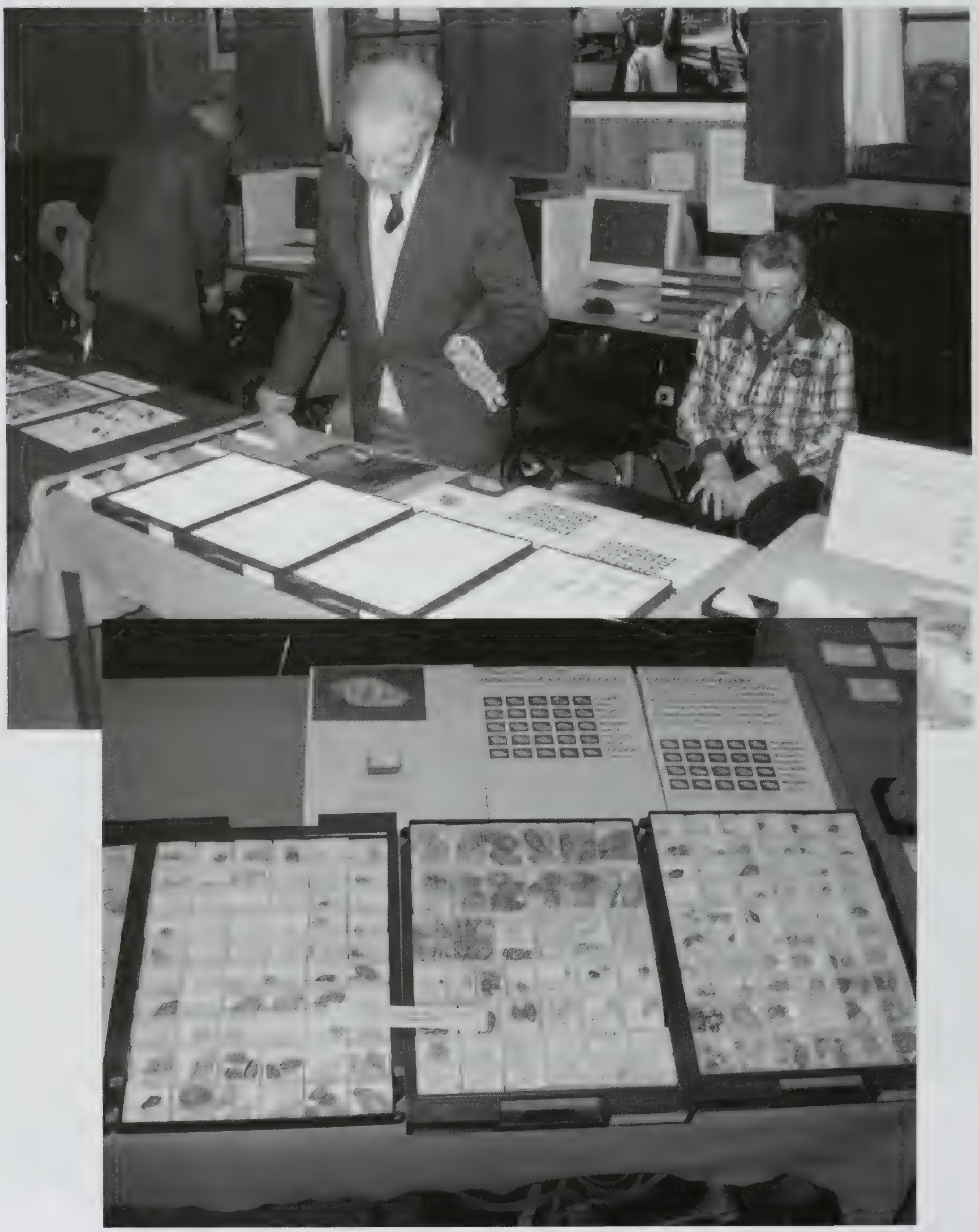
Quelques bivalves que j'aime…

Annie Langleit

Expo 2008

Quelques Marginellidae

Jacques Senders



Expo 2008

Quelques belles coquilles d'Amérique du Sud

Claude VILVENS & Etienne MEULEMAN

Une fois n'est pas coutume, pourquoi ne pas s'associer pour présenter ensemble l'exposition. Les coquilles d'Amérique du Sud n'étant pas légion dans nos collections, nous avons pensé qu'il pourrait être intéressant pour étoffer la table de les rassembler pour permettre aux visiteurs de découvrir un panel plus large d'espèces Sud-Américaines. Après fusion de nos espèces respectives voilà le résultat obtenu…

Province argentine
Province magellane

Voilà la liste des espèces exposées :

Architectonicidae	*Heliacus cylindricus*	(Gmelin, 1791)	Brésil (île d'Itaparica)	C.V.
Architectonicidae	*Architectonica nobilis*	Röding, 1798	Brésil (Tamadare)	E.M.
Arcidae	*anadara Brasiliana*	(Lamarck, 1819)	Brésil (Sao Paulo)	E.M.
Arcidae	*Anadara ovalis*	(bruguière, 1789)	Brésil (Sao Paulo)	E.M.
Buccinidae	*Aeneator loisae*		Chili (Coquimbo)	E.M.
Bursidae	*Bursa bufo*	(Bruguière, 1792)	Brésil (Recife)	E.M.
Calliostomatidae	*Calliostoma bullisi*	Clench & Turner, 1960	Brésil (Itaparica Island)	C.V.
Calliostomatidae	*Calliostoma coppingeri*	(Smith, 1880)	Argentine (Rio Negro)	C.V.
Calliostomatidae	*Calliostoma delli*	McLean & Andrade, 1982	Chili (au large de Quintero)	C.V.
Calliostomatidae	*Calliostoma jacquelinae*	Mc Lean, 1970	Galapagos (San Cristobal)	C.V.
Calliostomatidae	*Calliostoma jucundum*	(Gould, 1849)	Argentine (San Antonio Oeste)	C.V.
Calliostomatidae	*Calliostoma militaris*	(von Ihering, 1907)	Brésil (Rio de Janeiro)	C.V.
Calliostomatidae	*Calliostoma nordenskjoldi*	Strebel, 1908	Uruguay (île de Lobos)	C.V.
Calliostomatidae	*Calliostoma vinosum*	Quinn, 1992	Brésil (Guarapari)	C.V.
Calliostomatidae	*Photinula coerulescens*	(King & Broderip, 1831)	Argentine (Ushuaia)	C.V.
Cardiidae	*Laevicardium brasiliarum*		Brésil (Itamaraca)	E.M.
Cardiidae	*Papyridea soleniformis*	(bruguière, 1789)	Brésil	E.M.
Cassidae	*Cassis Tuberosa*	(Linné, 1758)	Brésil	E.M.
Cassidae	*Morum oniscus*	(Linné, 1767)	Brésil	E.M.
Cassidae	*Phalium granulatum granulatum*	(Born, 1778)	Brésil	E.M.
Cassidae	*Phalium granulatum peristephes*	Pilsbry & McGinty 1939	Brésil (North Santos)	E.M.

Cassidae	*Semicassis labiata iheringi*	(Carcelles, 1953)	Brésil (Sao Paulo)	E.M.
Cerithiidae	*Cerithium atratum*	(Born, 1778)	Colombie (La Guajira)	C.V.
Chilodontidae	*Bathybembix humboldti*	Rehder, 1971	Pérou	C.V.
Chilodontidae	*Bathybembix macdonaldi*	(Dall, 1890)	Chili	C.V.
Corbiculidae	*Neocorbicula limosa*	Maton, 1809	Uruguay (Soriano)	E.M.
Corbiculidae	*Neocorbicula manilensis*		Uruguay (Soriano)	E.M.
Crepidulidae	*Crepidula peruviana*	Lamarck, 1822	Pérou (Lima)	E.M.
Cymatidae	*Fusitriton magellanicum*	(Röding, 1798)	Argentine	E.M.
Donacidae	*Donax Hanleyanus*	Philippi	Uruguay (Rocha)	E.M.
Fissurellidae	*Fissurella latimarginata*	Sowerby, 1835	Chili (Caldera)	C.V.
Fissurellidae	*Fissurella maxima*	Sowerby, 1834	Chili (Cobquecura)	C.V.
Fissurellidae	*Fissurella punctatissima*	Pilsbry, 1890	Chili (Carriac Bajo)	C.V.
Fissurellidae	*Fissurella peruviana*	Lamarck, 1822	Pérou	E.M.
Littorinidae	*Littoraria angulifera*	(Lamarck, 1822)	Brésil (Guarapari channel)	C.V.
Littorinidae	*Littoraria nebulosa*	(Lamarck, 1822)	Vénézuela (Barcelona)	C.V.
Littorinidae	*Nodilittorina peruviana*	(Lamarck, 1822)	Chili (Algarrobo)	C.V.
Littorinidae	*Nodilittorina vermeiji*	Bandel & Kadolsky, 1982	Brésil (île Fernando de Noronha)	C.V.
Lucinidae	*Divaricella quadrisulcata*	(Orbigny, 1842)	Brésil (Itamaraca)	E.M.
Mactridae	*Mactra Isabelleana*	(D'orbigny)	Uruguay (Piriapolis)	E.M.
Megalobulimidae	*Megalobulimus oblongus*	(Müller, 1774)	Uruguay	C.V.
Melongenidae	*Pugilina morio*	(Linné, 1758)	Brésil	E.M.
Mesodesmatidae	*Mesodesma donacium*	(Lamarch, 1818)	Chili (Coquimbo)	E.M.
Muricidae	*Concholepas concholepas*	(Bruguière, 1792)	Pérou	E.M.
Muricidae	*Hexaplex princeps*	(Broderip, 1833)	Pérou	E.M.
Muricidae	*Homalocantha oxycantha*	(Broderip, 1833)	Equateur	E.M.
Muricidae	*Murex chrysostoma*	Sowerby, 1834	Venezuela	E.M.
Muricidae	*Purpura planospira*	(Lamarck, 1822)	Pérou	E.M.
Muricidae	*Siratus consulea*	A.H. Verrill, 1950	Brésil (Cacoes)	E.M.
Muricidae	*Stramonitrophon plicatus*	(Lightfoot, 1786)	Argentine (Golfe de San José)	E.M.
Muricidae	*Trophon geversianus*	(Pallas, 1774)	Argentine (Tierra del Fuego)	E.M.
Muricidae	*Trophon varians*		Argentine	E.M.
Mycetopodidae	*Anodontites crispatus*	D'orbigny, 1835	Argnetine (Arroyo guaviyu)	E.M.
Mycetopodidae	*Anodontites felix*	Pilsbry	Uruguay	E.M.
Mycetopodidae	*Anodontites spixii*	D'orbigny, 1835	Argentine (Arroyo Mandisovi)	E.M.
Mycetopodidae	*Anodontites trapesialis*	Gray, 1865	Uruguay (Rio Yi)	E.M.
Olividae	*Oliva fulgurator*	Röding, 1798	Venezuela	E.M.
Olividae	*Oliva peruviana*	Lamarck, 1811	Chili (Loco y Conchas)	E.M.
Pectenidae	*Chlamys ornata*	(Lamarck, 1819)	Brésil (Guarapari)	E.M.
Pectenidae	*Chlamys patagonica*	(Dunker, 1850)	Argentine	E.M.
Pholadidae	*Cyrtopleura costata*	(Linné, 1758)	Brésil	E.M.
Psamobiidae	*Asaphis deflorata*	(Linné, 1758)	Brésil	E.M.
Psamobiidae	*Sanguinolaria cruenta*	(Lightfoot, 1786)	Brésil (Camburiu)	E.M.
Siliquariidae	*Siliquaria modesta*	Dall, 1881	Brésil (Barra, Salvador, Bahia)	C.V.
Solecurtidae	*Tagelus plebeius*	(Lightfoot, 1786)	Brésil (Rio grande del Sul)	E.M.
Spondylidae	*Spondylus americanus*	(Hermann, 1781)	Brésil (Fortaleza)	E.M.
Spondylidae	*Spondylus gilvus*	(Reve, 1856)	Brésil (Recife)	E.M.
Spondylidae	*Spondylus ictericus*	(Reve, 1856)	Brésil (Recife)	E.M.
Strombidae	*Strombus gallus*	(Linné, 1758)	Brésil	E.M.
Strombidae	*Strombus goliath*	Schröter, 1805	Brésil	E.M.
Strombidae	*Strombus granulatus*	Swainson, 1822	Chili	E.M.
Strombidae	*Strombus peruvianus*	Swainson, 1822	Nord Pérou	E.M.
Strophocheilidae	*Chiliborus chilensis*	Sowerby, 1833	Chili (Zappatta)	C.V.
Strophocheilidae	*Strophocheilus pudicus*	Müller, 1774	Brésil (Ilheus, état de Bahia)	C.V.
Turbinellidae	*Vasum cassiforme*	(Kiener, 1841)	Brésil	E.M.
Turbinidae	*Astrea brevispina*	Lamarck, ?	Colombie (La Guajira)	C.V.
Turbinidae	*Astrea latispina*	(Philippi, 1844)	Brésil (Meaipe)	C.V.

Turbinidae	*Lithopoma tuber*	(Linné, 1767)	Vénézuela (Pampatar)	C.V.
Turbinidae	*Prisogaster niger*	(Wood, 1828)	Chili (Maitencillo)	C.V.
Turbinidae	*Tegula ignota*	Ramirez-Bohme, 1976	Chili	C.V.
Turbinidae	*Tegula orbignyana*	(Pilsbry, 1900)	Argentine (Lago Escondido)	C.V.
Turbinidae	*Tegula panamensis*	(Philippi, 1849)	Equateur (Anconcito)	C.V.
Turbinidae	*Tegula patagonica*	d'Orbigny, 1840	Uruguay (La Pedrera)	C.V.
Turbinidae	*Turbo canaliculatus*	Hermann, 1781	Brésil (Salvador de Bahia)	C.V.
Turbinidae	*Tegula atra*	(Lesson, 1830)	Chili (Palo Buque Beach)	C.V.
Veneridae	*Amiantis purpuratus*		Brésil	E.M.
Volutidae	*Adelomelon beckii*		Argentine	E.M.
Volutidae	*Adelomelon brasiliana*	(Lamarck, 1811)	Argentine	E.M.
Volutidae	*Odontocymbiola americana*	(Reve, 1856)	Brésil	E.M.
Volutidae	*Zidonia dufresnei*	(Donovan, 1823)	Argentine	E.M.
Volutidae	*Zidonia dufresnei*	(Donovan, 1823)	Brésil (Rio de Janeiro)	E.M.
Xenophoridae	*Tugurium Caribaeum*	Petit	Brésil	E.M.

Merci à tous de votre participation et à l'année prochaine…

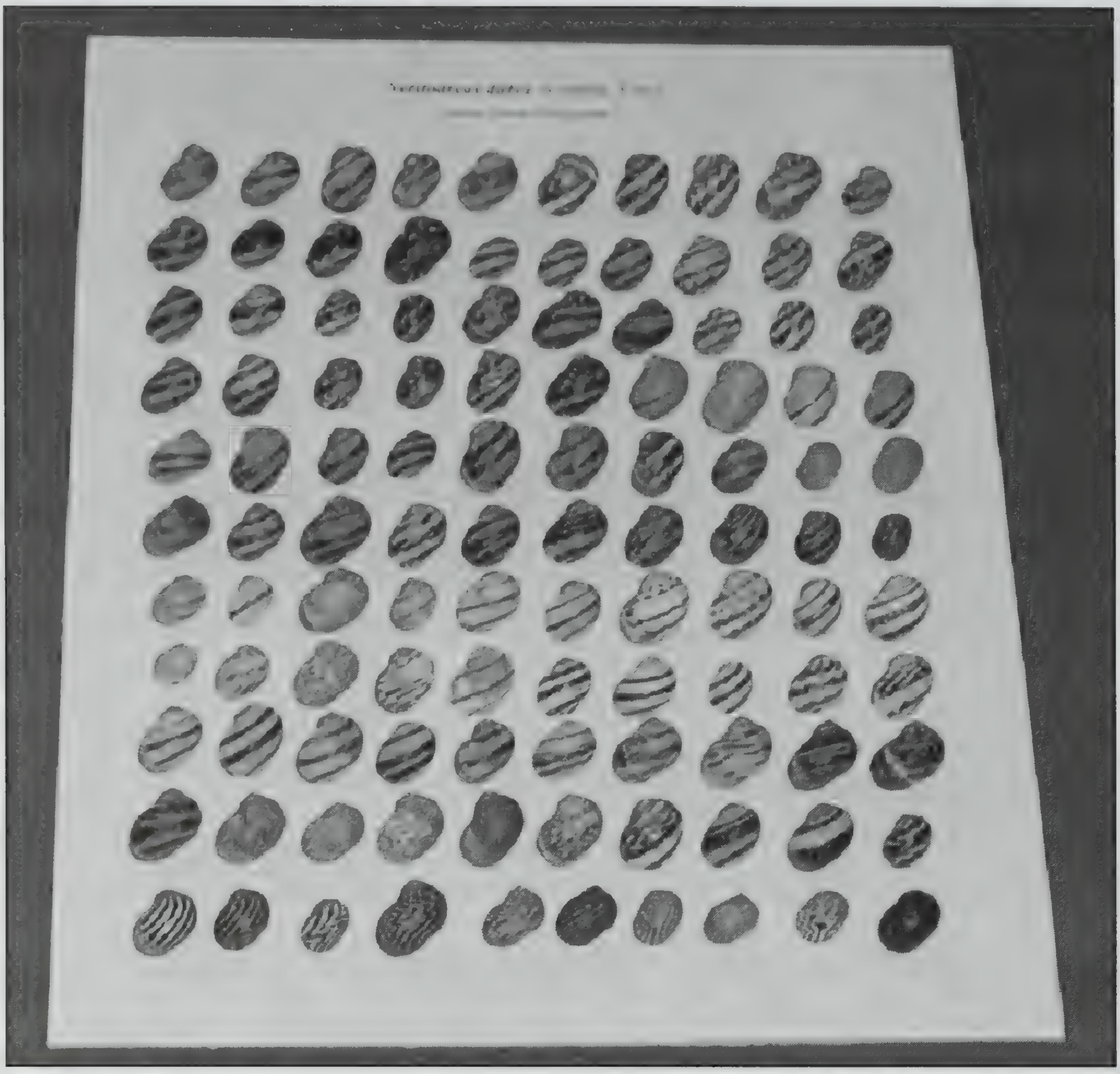
Je ne résiste pas à la tentation de vous partager le montage réalisé par Roland…

Rendez-vous à l'année prochaine – EXPO will return …

Le Genre *Neritodryas* von Martens, 1869

Ralph DUCHAMPS

Ce genre est peu connu, voire inconnu de pas mal de malacologues ou simples collectionneurs. Il nous est apparut dans des collections ou dans des listes de vente sous la dénomination de « *Natica* », « *Helix* » ou « *Nerita* ».



Si dès l'origine de la systématique introduite par Linnæus, le nom de *Nerita* apparaît en 1758, cette appellation englobe pas mal de concepts qui n'ont rien à voir avec les *Nertidæ* (Ex. *Natica*). Par contre, certaines espèces comme *cornea* ou *porcellana* furent décrites par Linnæus sous les genres respectifs de *Helix* et *Patella*. Ils appartiennent aujourd'hui aux genres *Neritodryas* et *Septaria*. Il a fallu attendre 1816 pour assister à la création par Lamarck, du genre *Neritina*. A cette époque on enregistre une définition très catégorique, les *Neritidæ* marins sont des *Nerita*, tandis que les *Neritina* proviennent d'eaux douces. Ces notions ont à juste titre bien évoluées depuis. Si nous devions poursuivre cette classification arbitraire des 18è et 19è siècle nous devrions déclarer que les espèces du genre *Neritodryas* sont des *Neritidæ* terrestres. En effet, ces mollusques vivent en général le long des fleuves et cours d'eaux jusqu'à l'embouchure qui conduit à la mer. Les *Neritodryas* se fixent sur des pierres, des racines de palétuviers ou des troncs d'arbres, mais dans la partie aérienne ; donc hors de l'eau. Certains auteurs ou récolteurs tels que Sowerby, Cuming, Reeve, Récluz et von Martens déclarent que les récoltes ont été faites à des hauteurs jusqu'à 7 m au dessus du niveau de l'eau. Ce qui est certain, c'est que ces espèces doivent vivre dans un milieu chaud et humide et profiter des embruns.

En systématique cela se présente de la manière suivante :

Phylum	Mollusca
Classe	Gastropoda
Sous-classe	Prosobranchia ou Streptoneura (système nerveux croisé par suite de la torsion du corps, branchies vers l'avant du corps)
Super-famille	Neritoidea
Famille	Neritidæ
Genre	*Neritodryas*

Les caractéristiques principales de ce genre sont : une coquille globuleuse et légère, une spire basse et aplatie aux tours peu nombreux, fréquemment érodés. Le dernier tour est grand, sa surface lisse ou avec une sculpture spiralée large et peu profonde, absence totale d'épines. La couleur va du jaune orangé au brun très sombre, et d'une teinte uniforme parfois traversée de lignes, zébrures et (ou) taches plus ou moins nombreuses. L'ouverture demi circulaire a un aspect de porcelaine, la lèvre externe est tranchante. L'ombilic est clos. La columelle est lisse et brillante ; son bord est entier ou garni de petits denticules.

L'opercule calcaire est costulé, en forme de demi lune à bord tranchant. Pauci spiral, le nucléus est excentré ; la face externe est lisse et parfois très légèrement granuleuse, la teinte va du brun foncé au noir absolu. La face postérieure possède 2 apophyses, dont la supérieure est longue, incurvée, avec des côtes se terminant en forme de digitations. L'apophyse inférieure est arrondie et fait penser à une cheville.

La radula rhipidoglosse de formule ~. 5. 1. 5. ~. soit 1 dent rachidienne centrale « **R** » plus large que longue, une première dent latérale « **L 1** » allongée de forme rectangulaire, la suivante « **L 2** » est trapézoïdale, la « **L 3** » de forme triangulaire et posée sur sa pointe forme la liaison entre les précédentes et les dents « **L 4 & L 5** ». Suivent, les dents marginales uncinées au nombre de 138 chez *N. cornea*.

Le genre *Neritodryas* a pour espèce type : *N. cornea* (Linnæus, 1758). La description est plus que succincte, et donne comme référence la fig. « M » de la planche X de d'Argenville 1ère édition 1742. A ne pas confondre avec les rééditions de 1757, 1772 et 1780 reprises par de Favanne où la planche correspondante est la VII.

Nerytodryas cornea (Linnæus, 1758) Coquille semi-globuleuse, spire faible comportant 3 tours dont le dernier est très convexe, très grand dernier tour pourvu de sillons décurrents qui s'effacent vers la fin de ce tour. Ce caractère est indiqué par Linnæus : *obsolete striata*. La coloration externe est très variable de même que le pattern. La callosité columellaire est jaunâtre avec parfois une large tache rouge sanguin vers la base. L'opercule est d'un brun noirâtre, liseré de clair, du côté du labre.
Dimensions : haut. ≤ 26 mm, larg. ≤ 26 mm, prof. ≤ 15 mm ; Ouverture h. ± 11,5 mm l. ± 15 mm.
Espèce côtière, embouchure de fleuve vivant au dessus du niveau de l'eau, dans les mangroves, sur les racines d'arbres ou sur des pierres. La distribution se réparti dans le sud-est Pacifique.

Nerytodryas dubia (Gmelin, 1791) La description est très comparable à *N. cornea*, mais l'apex est plus saillant, absence de sillons sur le dernier tour, lignes de croissance bien visibles, l'ouverture va du jaune foncé au rouge, la columelle est teintée de jaune orangé à noir en passant par le rouge. Les dimensions, de même que la distribution sont identiques à l'espèce précédente. Toutefois, la radula est légèrement différente de celle de *N. cornea*.

Nerytodryas dubia (Gmelin, 1791) var. *apiata* (Récluz, 1843) ou espèce ?. Considérée par l'auteur comme espèce endémique de l'Ile Negros (Philippines) vivant dans les torrents montagneux, et appartenant au genre *Neritina*, nous devons rectifier cela. Ce mollusque appartient au genre *Neritodryas* dont il présente toutes les caractéristiques, et qui se démarquent en ordre principal du genre *Neritina* par une radula et un opercule très différents. Par contre, s'agit-il d'une espèce en soi, ou d'une variété de *N.dubia*. Récluz en 1850 renvoie le lecteur vers Sowerby, 1849, sp. 38. Celui-ci reprend la description de Récluz qu'il complète en écrivant « semblable à *dubia*, mais avec une spire moins marquée et une columelle vraiment peu crénelée. Reeve (1855) reprend le même texte que Sowerby, tandis que v. Martens (1879) ne prend pas position, n'ayant jamais eu l'occasion de voir un spécimen, et constatant que personne ne possède de radula ni d'opercule. Tryon (1888) opte pour une variété, à moins que ce ne soit un exemplaire juvénile (16 mm). Dans notre collection nous possédons un exemplaire de 22, 92 mm d'une taille adulte et qui correspond totalement aux descriptions de Récluz & Sowerby, et dont l'origine est l'Ile Negros, mais nous ne possédons pas la partie molle, ni l'opercule.

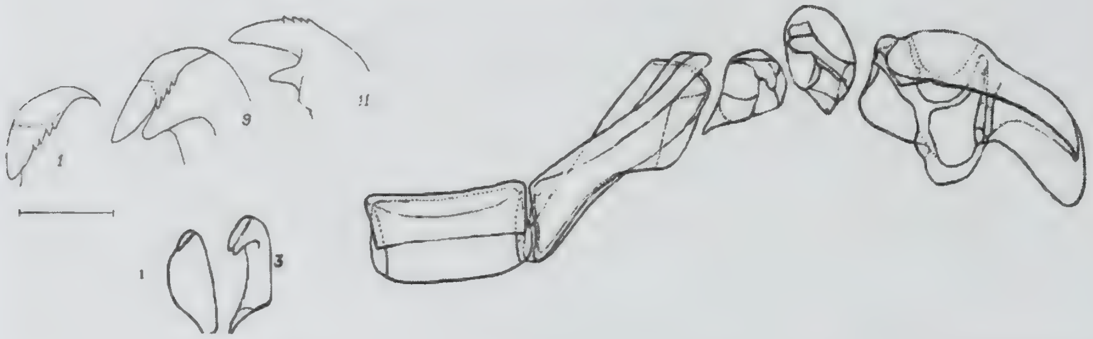
Nerytodryas subsulcata (Sowerby, 1836). Cette espèce a été considérée comme *Nerita* par Linnæus, 1758 (Syst. Nat. X : 777) ; *Neritina subsulcata* Sowerby, 1836 ; *Neritina sulcata* Anton, 1839 ; *Neritina cornea* var. *subsulcata* Sowerby, 1849 pour finalement être classé par v. Martens dans un nouveau genre : *Neritodryas* en 1869 et apparaître comme une espèce séparée et valide. La coquille est semi-globuleuse avec une spire étroite

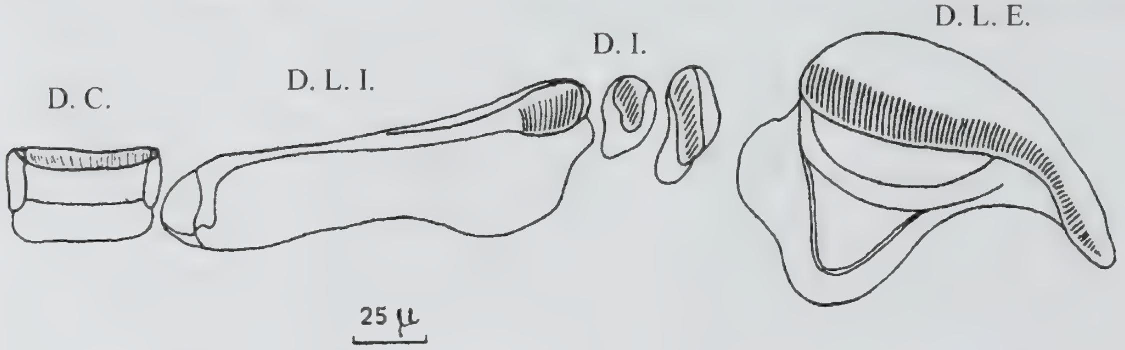
comportant 3, 5 tours. Le dernier tour est grand de teinte olive à brun avec des sillons plus marqués que chez *cornea* . L'ouverture est très oblique, grande et semi-lunaire. La plage columellaire est large, aplatie, elle présente un aspect de porcelaine blanche marquée d'un nuage foncé, noirâtre depuis la zone pariétale. Le bord columellaire est droit et légèrement concave.
Dimensions : haut. ≤ 37 mm, larg. ≤ 28 mm, prof. ≤ 21 mm ; Ouverture h. ± 10 mm l. ± 22 mm.
Distribution : Malaisie, Indonésie, Philippines, Ile Nicobar, Fidji, Nouvelles Hébrides, Iles Salomons.

Neritodryas chimmoi (Reeve, 1856) La différence par rapport aux espèces précédentes est telle, qu'aucune confusion n'est possible. Les parties molles contiennent des pigments qui teintent l'animal en bleu sombre. La coquille est ovale, la spire est faiblement saillante et très souvent érodée. Les tours supérieurs sont concaves, striés de côtes ou sillons, qui sont quelque peu fluxueux sur la suture. Le dernier tour comporte 27 stries. L'ensemble de la coquille est garni d'un périostracum variant du brun au noir. La plage columellaire est lisse, subaiguë, en pente descendante, teintée de couleur sang sur fond noirâtre. L'opercule corné est rouge-bleuâtre.
Dimensions : haut. ≤ 39 mm, larg. ≤ 30, 5 mm, prof. ≤ 21 mm Ouverture h. ± 19 mm l. ± 26 mm.
v. Martens cite une hauteur de 42 mm et une largeur de 35 mm.
Distribution : Nouvelle Calédonie.

Neritodryas notabilis Riech, 1935 Cette espèce, de description plus récente, est plus grande que les précédentes. Elle devrait se retrouver dans beaucoup de collections, ce qui n'est apparemment pas le cas. Cela s'explique probablement par son aire de distribution qui à ce jour se limite aux Iles Salomons. La coquille est semi-globuleuse et oblique par rapport à son axe. La spire compte 3 ¾ tours et le dernier tour présente a sa partie supérieure un cordon important sur toute sa longueur. Le dernier tour comporte 30 à 35 stries. L'ensemble de la coquille est garni d'un périostracum variant du brun au noir. Le pattern se compose de lignes brisées, noires, courant sur toute la longueur sous l'aspect de 3 bandes. Parfois se décor se présente d'une manière treillissée. La plage columellaire est lisse et brillante subaiguë, en pente descendante, de couleur verdâtre, marquée d'un nuage foncé, noirâtre depuis la zone pariétale. Le bord columellaire est garni de 14 à 20 denticules. Dimensions : haut. ≤ 51,5 mm, larg. ≤ 47 mm, prof. ≤ 40 mm ; Ouverture h. ± 28 mm l. ± 37 mm.
Distribution : Les Iles Salomon ; Choiseul, Malaita, Namatanai, Buma, Doma, Guadalcanal.

Radula de *Neritodryas cornea*





— **Dents radulaires de *Neritodryas chimmoi*** (Reeve, 1856)
D. C. Dent Centrale (rachidienne)
D. L. I. Dent Latérale Interne
D. I. Dent Intermédiaire
D. L. E. Dent Latérale Externe

D'après Starmühlner, 1970 (modifié) O.R.S.T.O.M. sér. Hydrobiol., vol. IV, n° 3/4 : 34 Fig. 11

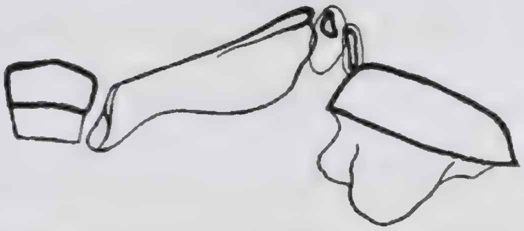
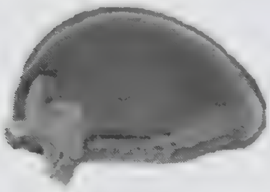


Abb. 20. Radula von *Neritodryas notabilis* Riech.
Archiv für naturgestichte, 1937 vol. 6 : 75

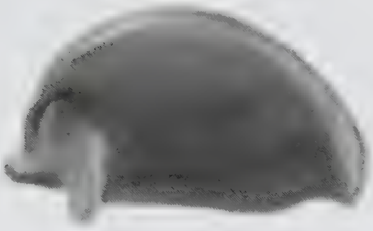
Neritodryas cornea
(Linnæus, 1758)
opercule face externe

Neritodryas cornea
(Linnæus, 1758)
opercule face interne

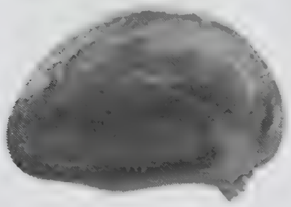


Neritodryas dubia
(Gmelin, 1791)
opercule face externe

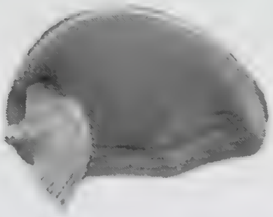
Neritodryas dubia
(Gmelin, 1791)
opercule face interne



Neritodryas subsulcata
(Sowerby, 1836)
opercule face externe



Neritodryas subsulcata
(Sowerby, 1836)
opercule, face interne



Le genre *Rapana* Schumacher, 1817 (Gastropoda: Muricidae: Rapaninae)

Roland HOUART

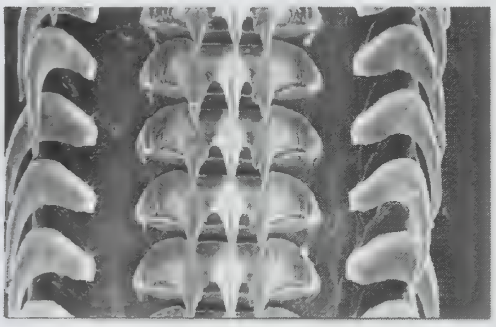
Les Muricidae, dont les *Rapana* font partie, sont composés de plus ou moins 1500 à 1600 espèces récentes (non fossiles) et se divisent en 10 sous-familles (ou 9 selon des avis divergents).
Rapana est le genre type de la sous-famille des Rapaninae, autrefois connue également sous le nom de Thaidinae (un synonyme). D'autres noms ont d'ailleurs été proposés pour cette sous-famille.
D'autres genres dont les noms nous sont familiers appartiennent à cette sous-famille : *Concholepas* Lamarck, 1801, *Drupa* Roding, 1798, *Drupella* Thiele, 1925, *Purpura* Bruguière, 1789, *Thais* Röding, 1798, *Mancinella* Link, 1807, pour en citer parmi les plus connus.
Le genre *Rapana* est lui seulement représenté par 3 espèces récentes, totalisant quand même 11 noms, dont 8 sont des synonymes plus récents.

Rapana bezoar (Linnaeus, 1767) (espèce type)
  Buccinum bezoar Linnaeus, 1767
  Volema pheata Röding, 1798
  Rapana foliacea Schumacher, 1817

Rapana rapiformis (Born, 1778)
  Murex rapiformis Born, 1778
  Murex rapa Gmelin, 1791
  Rapa volema Röding, 1798
  Buccinum bulbosa Dillwyn, 1817

Rapana venosa (Valenciennes, 1846)
  Purpura venosa Valenciennes, 1846
  Rapana marginata Valenciennes, 1846
  Rapana thomasiana Crosse, 1861
  Rapana pechiliensis Grabau & King, 1928

La coquille des *Rapana* est généralement volumineuse, atteignant parfois plus de 20 cm. Elle est ornée de nombreuses lamelles axiales ou de varices et de nombreux cordons spiraux.
L'ouverture est large et protégée par un opercule corné avec nucleus latéral (Fig. 3).
Le canal siphonal est court, très large avec un ombilic très prononcé.
La ruban radulaire (Figs 1-2) des *Rapana* est formé de nombreuses dents composées d'une dent rachidienne et de deux dents latérales. La rachidienne est ornée d'un long denticule central, d'un denticule latéral flanqué de petites pointes, et de nombreux petits denticules marginaux. Les deux dents latérales sont en forme de faucille avec une base assez large.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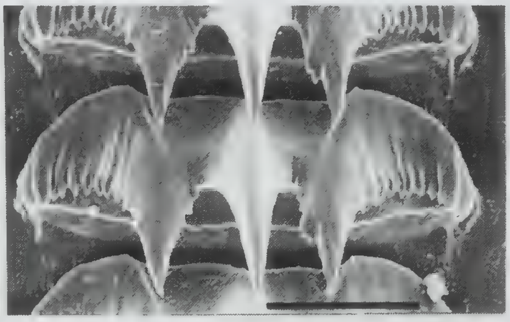
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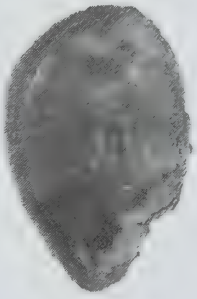
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1-2. Radula de *Rapana venosa* (échelle 100 µm)
3. Opercule de *Rapana rapiformis* (40 mm)

Deux autres genres sont parfois confondus avec le genre *Rapana*: le genre *Neorapana* Cooke, 1918, [exemple *Neorapana grandis* (Sowerby, 1835) (Fig. 11)] un autre genre des Rapaninae et *Rapa* Bruguière, 1792, [exemple

Rapa rapa (Linnaeus, 1758) (Fig. 12)] un Coralliophilinae (autre sous-famille des Muricidae). Les Coralliophilinae sont caractérisés par l'absence totale de radula.

Rapana bezoar (Linnaeus, 1767)

Figs 4, 8-9

Rapana bezoar est la plus petite des trois espèces. Elle atteint exceptionnellement une hauteur de 90 mm (record: 90,7 mm) mais la taille moyenne varie entre 60 et 70 mm. Elle est ornée de très nombreuses lamelles axiales sur toute sa surface, de 5 ou 6 cordons spiraux primaires et de quelques cordons secondaires. Sa couleur varie du blanc sale au beige.
Elle vit principalement au nord-ouest de l'Océan Pacifique (Japon, Chine,Vietnam,Taiwan) (Fig. 4).

Rapana rapiformis (Born, 1778)

Figs 5, 7

Avec sa large ouverture, sa spire assez basse et son large canal siphonal, cette espèce est très reconnaissable parmi les *Rapana* et parmi toutes les espèces peuplant son aire de distribution. Sa taille moyenne varie entre 90 et 120 mm et le record homologué (Pisor, 2005) est de 142,7 mm. Elle est ornée de 4 cordons spiraux primaires peu distincts chez certains adultes et de nombreux cordons secondaires et tertiaires. La coquille est brune avec de fines bandes plus claires.
Son aire de répartition dans l'Indo-Pacifique est beaucoup plus étendue que celle de ses deux congénères (Fig. 5), depuis l'Afrique du Sud où elle est présente dans la Province du Natal, jusqu'en Mer Rouge, Dans tout l'Océan Indien jusqu'en Australie Occidentale, l'Indonésie, les Philippines, les côtes asiatiques, le sud du Japon, la Papouasie, le Queensland et la Nouvelle-Calédonie qui semble être la limite ouest pour la distribution de cette espèce dans l'Océan Pacifique.
Cette espèce est apparemment également invasive en Méditerranée avec une seule signalisation près du Canal de Suez (Barash & Danin, 1992 et Houart, 2001).

Rapana venosa (Valenciennes, 1846)

Figs 6, 10

Voici l'espèce la plus connue et la plus commune des *Rapana*. Elle est ornée de 4 cordons spiraux primaires, parfois bien visibles et de nombreux cordons secondaires et tertiaires. L'ouverture est très large, de couleur orange clair à orange vif sur le bord columellaire et sur le bord interne de la lèvre externe. La coquille elle-même est brune avec des cordons spiraux parsemés de taches plus foncées.
La taille moyenne de la coquille de *R. venosa* varie entre 90 et 120 mm de haut, mais elle peut dépasser les 20 cm, avec un record établi à 212,3 mm (Pisor, 2005). L'holotype de *Rapana thomasiana* (un synonyme), déposé au BMNH mesure 20 cm.
Son aire de répartition originale se limite au nord-ouest de l'Océan Pacifique, soit le Japon, la Corée, les côtes chinoises et Taiwan. Elle est maintenant également signalée en Indonésie (Dharma, 2001) et dans le Golfe d'Oman (Bosch et al, 1995).
Les ballasts de navires aidant, cette espèce s'est très vite développée en Mer Noire et dans la Méditerranée (Houart, 2001) et sa présence est maintenant signalée dans l'Atlantique et en Mer du Nord (Camus, 2001; Vink et al, 2005; Nieuweg & Vink, 2007).
D'autres signalisations récentes la rapportent des Etats-Unis (Virginie) et d'Argentine (Rio de la Plata) (Harding, 2005; Giberto et al, 2005).
Il est certain, au vu de la rapidité de dispersion de cette espèce, que nous la retrouverons bientôt dans d'autres régions du globe (Fig. 6).

Remerciements. Je remercie le Dr. Anders Warén (Museum d'Histoire Naturelle, Stockholm) pour la préparation et les photographies au microscope électronique à balayage de la radule de *Rapana venosa*.

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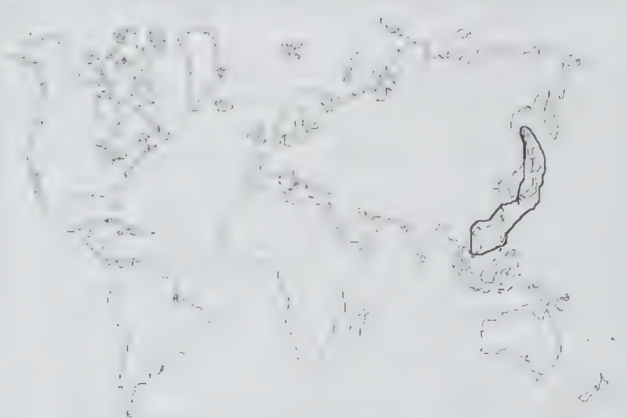


Fig. 4. Distribution géographique de *Rapana bezoar* (Linnaeus, 1767)

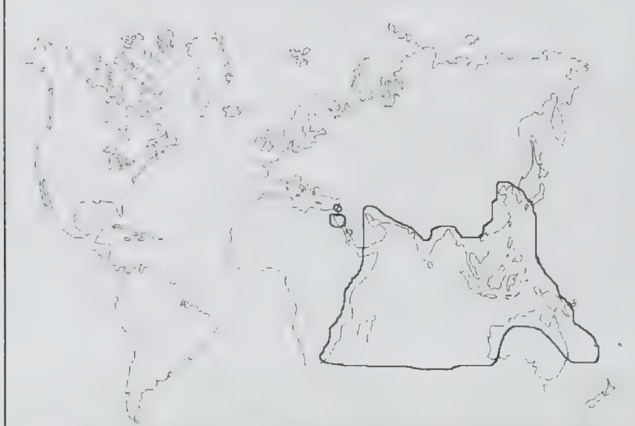


Fig. 5. Distribution géographique de *Rapana rapiformis* (Born, 1778)

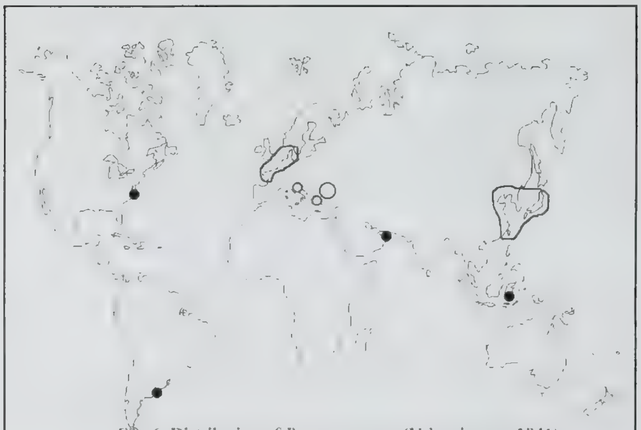
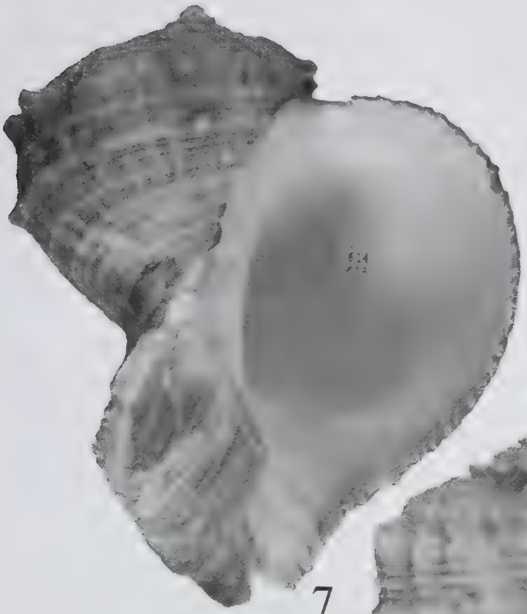


Fig. 6. Distribution of *Rapana venosa* (Valenciennes, 1846)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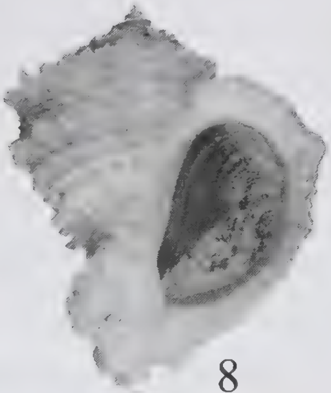
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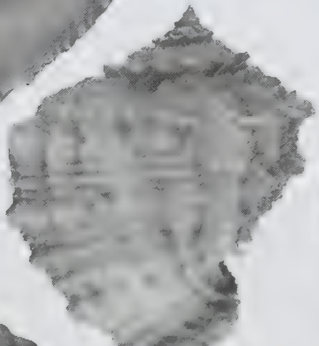
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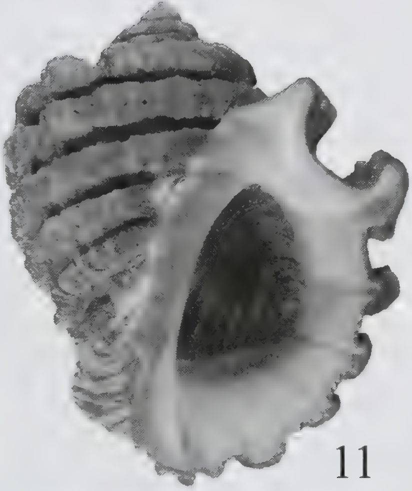
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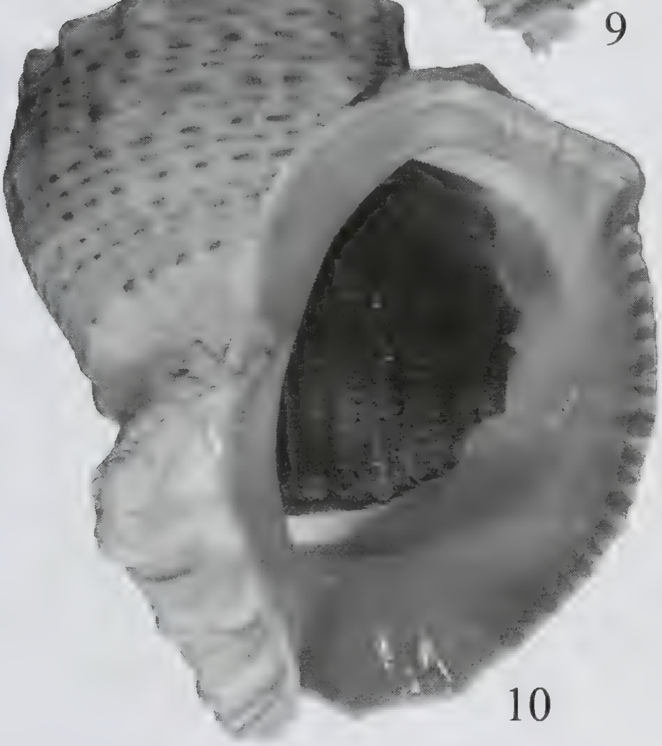
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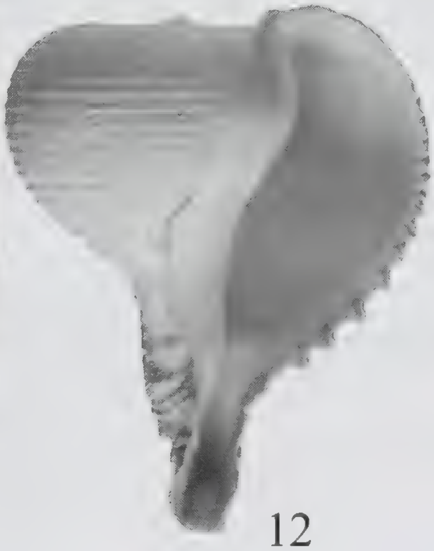
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Figures 7-10 (coll. R. Houart)

7. *Rapana rapiformis* (Born, 1778). Sorsogon, Philippines, 102 mm.
8-9. *Rapana bezoar* (Linnaeus, 1767). Anori, Shima, Mie Prefecture, Japon, 62 mm.
10. *Rapana venosa* (Valenciennes, 1846). Détroit du Bosphore, Turquie, 123 mm.
11. *Neorapana grandis* (Sowerby, 1835). Fernandina Id, Galapagos, 84,2 mm.
12. *Rapa rapa* (Linnaeus, 1758). Philippines, 86 mm.

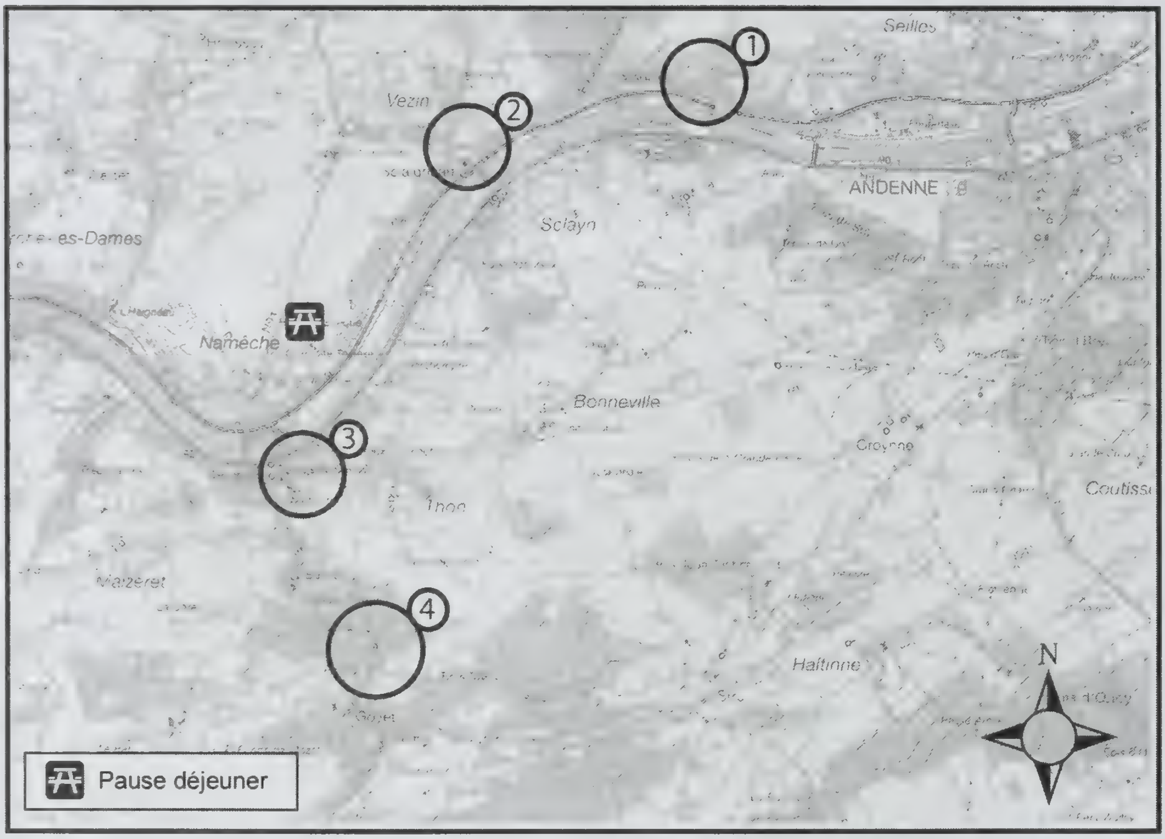
Excursion de la Société Belge de Malacologie Dans la Région d'Andenne (29 septembre 2007)

Etienne MEULEMAN

La région visitée en cette fin de mois de septembre se situe dans un triangle formé par Andenne, Namêche et Faulx-les-Tombes dans la Province de Namur. Les sites se trouvent en bord de Meuse. Rendez-vous fut donc donné aux courageux malacologues pour prospecter les environs en cette journée automnale. Notons que la pluie nous a presque épargné et ce n'est qu'en rentrant dans les voitures à la fin de la journée que quelques gouttes ont osé montrer le bout de leur nez.

Au cours de cette journée, quatre sites ont été inspectés :

- Site 1 : situé entre Andenne et Vezin à proximité de l'eau le long de la route. Terrain calcaire avec de la végétation basse.
- Site 2 : Sclaigneau (Vezin) non loin d'une carrière.
- Site 3 : Le long de la N942 en direction de Faulx-les-Tombes au carrefour avec la route qui se dirige vers Thon.
- Site 4 : Un peu plus loin sur la N942 en direction de Faulx-les-Tombes.


Seilles
1
Vezin
2
ANDENNE
Sclayn
es-Dames
Namêche
Bonneville
3
Croyenne
Coutisse
Thon
Mazeret
4
Haltinne
N
Pause déjeuner

Les déterminations sont basées sur les récoltes de Roland Houart, Claude Vilvens et Etienne Meuleman.

Site 1 : Entre Andenne et Vezin

Le site visité se trouve le long de la route non loin d la Meuse. Le terrain est de type calcaire avec une végétation composée d'herbe et de petits arbustes. Ce site s'est révélé intéressant surtout pour les petites espèces.

- Famille Cochlicopidae Pilsbry, 1900 (1879)
  - Genre *Cochlicopa* A. Férussac, 1821
    - ***Cochlicopa lubrica*** (O.F. Müller, 1774)
- Famille Valloniidae Morse, 1864
  - Genre *Vallonia* Risso, 1826
    - ***Vallonia costata*** (O.F. Müller, 1774) [Roland]
    - ***Vallonia pulchella*** (O.F. Müller, 1774)
- Famille Pupillidae Turton, 1831
  - Genre *Pupilla* Fleming, 1828
    - ***Pupilla (Pupilla) muscorum*** (Linnaeus, 1758)
- Famille Vertiginidae Fitzinger, 1833
  - Genre *Vertigo* O.F. Müller, 1773
    - ***Vertigo (Vertigo) pusilla*** O.F. Müller, 1774 [Roland only]
- Famille Clausiliidae J.E. Gray, 1855
  - Genre *Clausilia* Draparnaud, 1805
    - ***Clausilia (Clausilia) rugosa parvula*** (A. Férussac, 1807)
  - Genre *Balea* J.E. Gray, 1824
    - ***Balea (Alinda) biplicata*** (Montagu, 1803)
- Famille Patulidae Tryon, 1866
  - Genre *Discus* Fitzinger, 1833
    - ***Discus (Gonyodiscus) rotundatus*** (O.F. Müller, 1774)
- Famille Oxychilidae P. Hesse, 1927 (1879)
  - Genre *Oxychilus* Fitzinger, 1833
    - ***Oxychilus (Oxychilus) cellarius*** (O.F. Müller, 1774)
    - ***Oxychilus (Oxychilus) draparnaudi*** (H. Beck, 1837)
  - Genre *Aegopinella* Lindholm, 1927
    - ***Aegopinella nitidula*** (Draparnaud, 1805)
- Famille Bradybaenidae PILSBRY, 1934 (1898)
  - Genre *Fruticicola* Held, 1838
    - ***Fruticicola fruticum*** (O.F. Müller, 1774)
- Famille Helicodontidae Kobelt, 1904
  - Genre *Helicodonta* A. Férussac, 1821
    - ***Helicodonta obvoluta*** (O.F. Müller, 1774)
- Famille Cochlicellidae Schileyko, 1972
- Famille Hygromiidae Tryon, 1866
  - Genre *Trichia* W. Hartmann, 1840
    - ***Trichia (Trichia) hispida*** (Linnaeus, 1758)
  - Genre *Monachoides* Gude & B.B. Woodward, 1921
    - ***Monachoides incarnatus*** (O.F. Müller, 1774)
- Famille Helicidae Rafinesque, 1815
  - Genre *Helix* LINNAEUS, 1758
    - ***Helix (Helix) pomatia*** Linnaeus, 1758

Site 2 : Sclaigneau (Vezin)

Ce site est situé dans un sous-bois non loin d'une carrière dans le hameau de Sclaigneau. A cet endroit, une dizaine d'espèces ont été récoltées.

Famille Pomatiidae Newton, 1891
- Genre *Pomatias* S. Studer, 1789
  - ***Pomatias elegans*** (O.F. Müller, 1774)

Famille Clausiliidae J.E. Gray, 1855
- Genre *Clausilia* Draparnaud, 1805
  - ***Clausilia (Clausilia) bidentata*** (Ström, 1765)

Famille Patulidae Tryon, 1866
- Genre *Discus* Fitzinger, 1833
  - ***Discus (Gonyodiscus) rotundatus*** (O.F. Müller, 1774)

Famille Oxychilidae P. Hesse, 1927 (1879)
- Genre *Oxychilus* Fitzinger, 1833
  - ***Oxychilus (Oxychilus) cellarius*** (O.F. Müller, 1774)
  - ***Oxychilus (Ortizius) helveticus*** (Blum, 1881)
- Genre *Aegopinella* Lindholm, 1927
  - ***Aegopinella nitidula*** (Draparnaud, 1805)

Famille Bradybaenidae PILSBRY, 1934 (1898)
- Genre *Fruticicola* Held, 1838
  - ***Fruticicola fruticum*** (O.F. Müller, 1774)

Famille Helicodontidae Kobelt, 1904
- Genre *Helicodonta* A. Férussac, 1821
  - ***Helicodonta obvoluta*** (O.F. Müller, 1774)

Famille Hygromiidae Tryon, 1866
- Genre *Monachoides* Gude & B.B. Woodward, 1921
  - ***Monachoides incarnatus*** (O.F. Müller, 1774)

Famille Helicidae Rafinesque, 1815
- Genre *Cepaea* HELD, 1838
  - ***Cepaea (Cepaea) hortensis*** (O.F. Müller, 1774)
- Genre *Helix* LINNAEUS, 1758
  - ***Helix (Helix) pomatia*** Linnaeus, 1758

Avant de continuer notre parcours vers le troisième site, nous nous sommes octroyés un petit temps de repos pour déguster un petit repas ensemble dans un snack-friterie (la Petit Maison) à Namèche. Bon appétit ;-)

Continuons notre route le ventre plein et rendons-nous au :

Site 3 : Le long de la N942 au carrefour vers Thon

Le site se trouve dans un sous-bois. La récolte a été moins fructueuse, mais le site était agréable. Nous avons ici quitté la Meuse et nous nous trouvons dans une petite vallée creusée par la Rau de Samson.

Famille Pomatiidae Newton, 1891
- Genre *Pomatias* S. Studer, 1789
  - ***Pomatias elegans*** (O.F. Müller, 1774)

Famille Clausiliidae J.E. Gray, 1855
- Genre *Macrogastra* W. Hartmann, 1841
  - ***Macrogastra (Pseudovestia) rolphii*** (Turton, 1826)
  - ***Macrogastra (Pyrostoma) attenuata lineolata*** (Held, 1836)
- Genre *Clausilia* Draparnaud, 1805
  - ***Clausilia (Clausilia) bidentata*** (Ström, 1765)

Famille Oxychilidae P. Hesse, 1927 (1879)
- Genre *Oxychilus* Fitzinger, 1833
  - ***Oxychilus (Ortizius) helveticus*** (Blum, 1881)

Famille Bradybaenidae PILSBRY, 1934 (1898)
- Genre *Fruticicola* Held, 1838
  - ***Fruticicola fruticum*** (O.F. Müller, 1774)

Famille Helicodontidae Kobelt, 1904
- Genre *Helicodonta* A. Férussac, 1821
  - ***Helicodonta obvoluta*** (O.F. Müller, 1774)

Famille Hygromiidae Tryon, 1866

Genre *Monachoides* Gude & B.B. Woodward, 1921
- ***Monachoides incarnatus*** (O.F. Müller, 1774)

Famille Helicidae Rafinesque, 1815
Genre *Cepaea* HELD, 1838
- ***Cepaea (Cepaea) hortensis*** (O.F. Müller, 1774)

Genre *Helix* LINNAEUS, 1758
- ***Helix (Helix) pomatia*** Linnaeus, 1758 [Roland]

Site 4 : Un peu plus loin sur la route en direction de Faulx-les-Tombes

Le site est fort identique au site n°3 et le nombre d'espèces récoltées fut fort médiocre. ☹

Famille Pomatiidae Newton, 1891
Genre *Pomatias* S. Studer, 1789
- ***Pomatias elegans*** (O.F. Müller, 1774)

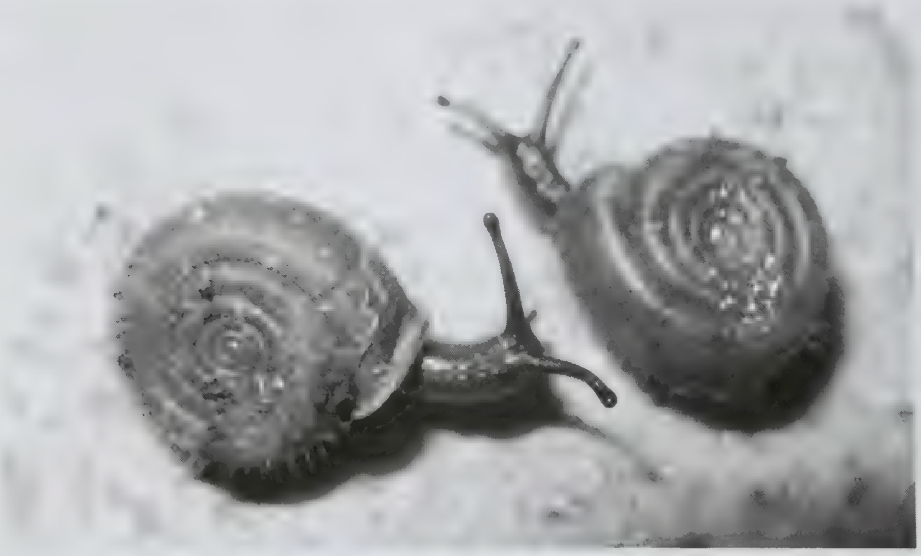
Famille Oxychilidae P. Hesse, 1927 (1879)
Genre *Oxychilus* Fitzinger, 1833
- ***Oxychilus (Oxychilus) cellarius*** (O.F. Müller, 1774)
- ***Oxychilus (Oxychilus) draparnaudi*** (H. Beck, 1837)
- ***Oxychilus (Ortizius) helveticus*** (Blum, 1881)

Famille Hygromiidae Tryon, 1866
Genre *Monachoides* Gude & B.B. Woodward, 1921
- ***Monachoides incarnatus*** (O.F. Müller, 1774)

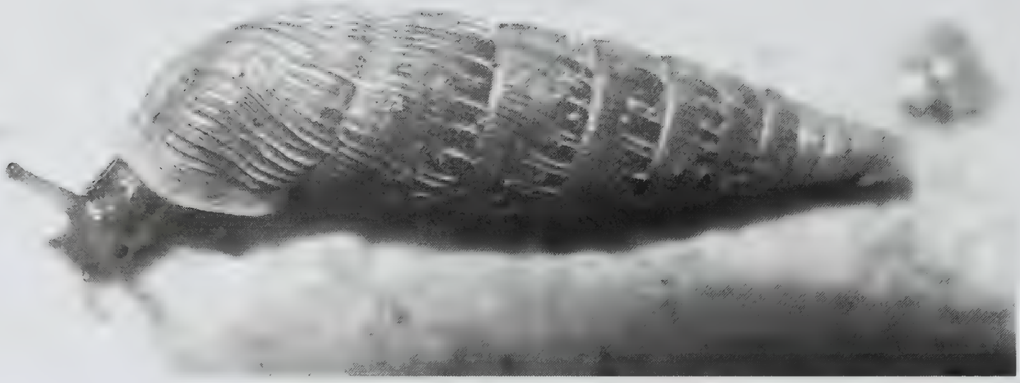
Famille Helicidae Rafinesque, 1815
Genre *Cepaea* HELD, 1838
- ***Cepaea (Cepaea) nemoralis*** (Linnaeus, 1758)

En conclusion, le bilan de la journée ne fut pas trop décevant. Merci à Roland, Claude et 1 de ses fils, Yvonne et un de ses neveux, Marc Alexandre et une de mes nièces d'êtres venus à cette excursion. Nous avons pu découvrir une belle région et passer une agréable journée à la recherche de coquillages. Merci à tous et rendez-vous encore plus nombreux j'espère à notre prochaine excursion.

Oxychilus (Oxychilus) draparnaudi (H. Beck, 1837)



Helicodonta obvoluta (O.F. Müller, 1774)



Clausilia bidentata (Ström, 1765)

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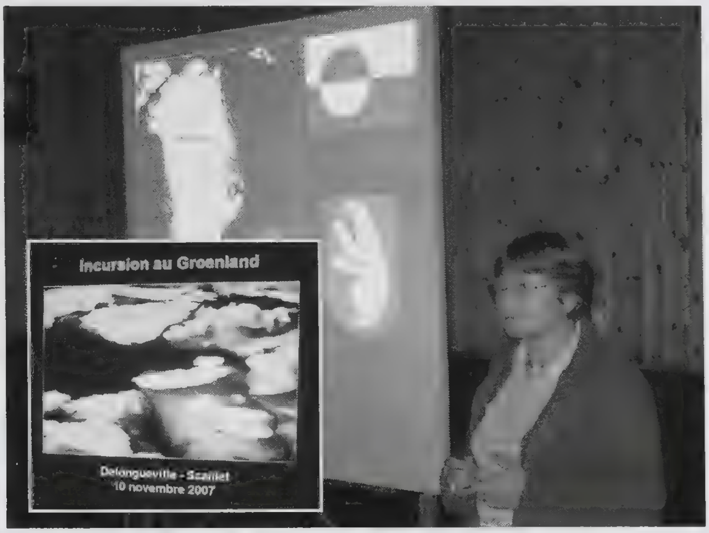
L'écho des réunions

Marc ALEXANDRE, Roland HOUART & Claude VILVENS

Réunion du 10 novembre 2007 (RH – ph.CV) ➔ Christiane Delongueville & Roland Scaillet : Incursion au Groenland.

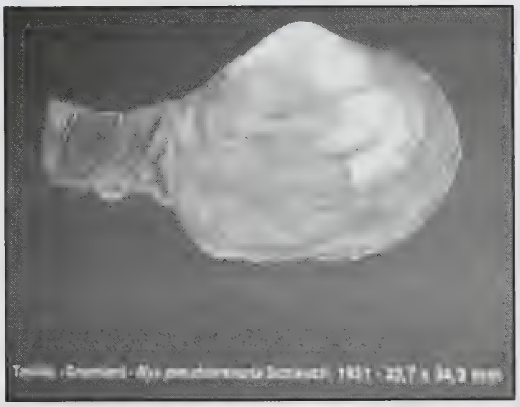
Tasiilaq - Groenland - Juillet 2006



Avec son brio habituel, Christiane Delongueville, aidé par Roland Scaillet à la préparation et à la projection, nous a présenté son séjour au Groenland.

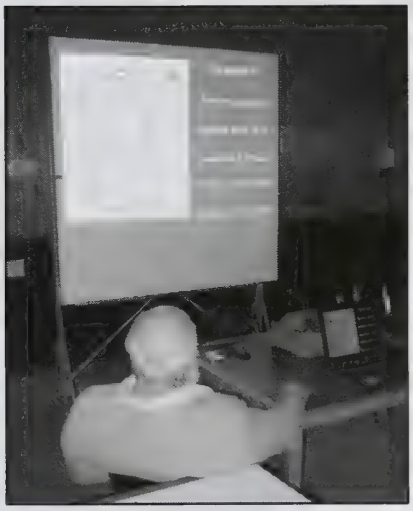
Avec des noms aussi enchanteurs que Kulusuk, Tasiilaq, Ikatek et Amitsivartik, les quatre endroits visités situés au Sud-est de l'île, nous pouvions nous attendre à un certain dépaysement. Ce fut chose faite !

Ce territoire arctique autonome relié au Danemark est quatre fois aussi grand que la France, mais possède une population d'à peine 57000 habitants. Elle est composée à 88% d'Inuits, venus de Sibérie en 6000 avant J.C.



Première étape: Kulusuk. Nous avons pu admirer quelques vues splendides, des maisons, des fjords, des glaciers, des icebergs et même un cimetière typique de l'endroit. Les récoltes sur les rochers n'ont rapportés que plusieurs *Littorina saxatilis*, espèce omniprésente, et un *Cryptonatica affinis* trouvé sur la plage.

Deuxième étape: Tasiilaq. Cette ville de 1924 habitants nous a valu quelques merveilleuses diapositives: petites maisons en planche, peintes en vert, bleu, jaune ou brun, noyées dans un paysage composé d'herbe, d'eau, de neige, de glaciers et de fleurs (nous étions au mois de juillet). Nous avons également visité par l'image une petite habitation typique du début du 20ème siècle. Une récolte effectuée sur la plage, parmi les fucus, le sable et les rochers a permis de trouver *Littorina saxatilis, Mytilus edulis, Mya pseudoarenaia* et *Serripes groenlandicus.*



Troisième étape: Ikatek. Un petit village où séchaient des peaux de phoques mais où la plage s'est révélée vide de mollusques.

Dernière étape: Amitisivartik. Une petite excursion dans un fjord à l'aide d'un habitant et de son canot a permis de récolter *Buccinum cyaneum* et autres gastéropodes et bivalves.

Toutes les espèces furent magnifiquement illustrées par de très belles diapositives.

Le Groenland, un territoire où les endroits abritant des mollusques sont malheureusement très difficiles d'accès et pour lequel la littérature spécialisée est quasi-inexistante, mais une île magnifique que Christiane a parfaitement bien illustrée par de splendides diapositives.

Réunion du 15 décembre 2007 (MA) → **Claude Vilvens : Les documentaires télévisés sur les mollusques à destination du grand public.**

Vous voulez des idées pour un mariage, un banquet, une conférence faîtes appel à Claude Vilvens comme on dit chez nous « il a toujours une pièce à mettre au trou », si nous sommes en panne de conférencier pour une réunion, ne vous tracassez pas Claude à une solution, un conférencier absent lors d'un de nos événements importants il le remplace au pied lever et avec panache.

L'équipe de c'est pas sorcier

Vous l'aurez compris la projection des documentaires, c'est l'idée de Claude et quelle idée, même si celle-ci peut paraître simpliste au départ, non ! non ! Pas avec Mr Vilvens car celui-ci ne fait jamais les choses à moitié.

Pour cette fois ci il nous avait préparé des devoirs, nous avons dû juger de la qualité des documentaires, du sérieux scientifique et aussi de leur approche vis-à-vis du grand public, devoirs que nous nous sommes tous appliqués de remplir car le maître surveillait, je plains ces élèves en interro ;-) et pas moyen de copier sur le voisin.

Lors de cette projection nous avons pu admirer quatre petits films, deux appartenaient à l'émission c'est pas sorcier (FR3) et deux au jardin extraordinaire (RTBF).

Les thèmes des différents films étaient les mollusques en général, les céphalopodes et les gastéropodes.

Claudine Brasseur du jardin Extraordinaire

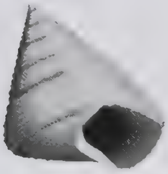
Suite à cette magnifique projection tout le monde a remis ces feuilles de cotation, les différents films étaient jugées sur :

- La structure du documentaire
- L'exactitude scientifique
- L'esthétique
- La démarche de vulgarisation
- L'apport naturaliste et environnemental

Voici les résultats :

- C'est pas sorcier : Les mollusques obtiennent une moyenne de 8,3/10
- Le jardin extraordinaire : Les gastéropodes obtiennent une moyenne de 8,3/10

- C'est pas sorcier : Les céphalopodes obtiennent une moyenne de 8,4/10
- Le jardin extraordinaire : Les céphalopodes obtiennent une moyenne de 8,2/10



Quoi de neuf ?

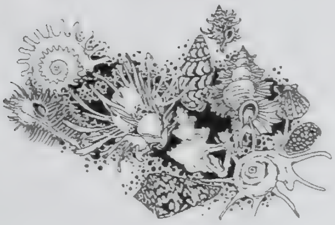
Claude VILVENS & Ralph DUCHAMPS

Comme chaque année : la Bourse d'Anvers de la BVC !

BELGISCHE VERENIGING VOOR CONCHYLIOLOGIE V.Z.W.
Belgian Society for Conchology - Association Belge de Conchyliologie

www.bvc-gloriamaris.be

18ième BOURSE INTERNATIONALE AUX COQUILLAGES



10 - 11 mai 2007
Antwerpen – Belgium

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Sports hall Schijnpoort
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Bourse de l' A.F.C. Section Nord

12 èmes Journées Internationales des Coquillages

Organisées par l' Association Conchyliologique du Nord

les 25 et 26 Octobre 2008
à FACHES-THUMESNIL (Sud de Lille)

***Renseignements et inscriptions*: Michel Ghesquière**
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Tél.: 03.20.39.09.13 / e-mail: michel.ghesquiere@tele2.fr

Marie Louise De Coster (Milou Bresson)
Née à Aarsele (Tielt) le 15-08-1922 - Décédée à Bruxelles, le 20-12-2007

Alors que la Noël se préparait chez nous tous, nous apprenions la pénible disparition de notre amie de 35 ans. Nous nous souvenons encore de sa démarche concernant la SBM et ses activités. Elle vint, accompagnée de son époux à une réunion de notre société. Nos activités ayant eu le don de lui plaire, Madame Bresson souscrivit immédiatement à son affiliation. C'était en 1972. Peu à peu sa participation à nos activités devint plus importante.

Au fil des ans elle présenta des comptes-rendus de voyages avec projection de dias, pour ARION, Milou reprit la rubrique « Visite chez un collectionneur » de même que l'assemblage de cette revue de la vie de la Sté Belge de Malacologie. Nombreux furent ses voyages, principalement en Afrique, au Salvador et aux Antilles. Son importante collection, comprends des spécimens qu'elle a récoltés et achetés dans ces régions. Elle était une fidèle participante aux excursions ainsi qu'aux banquets annuels. A la retraite de M. Georges Bresson, son époux, Milou nous quitta pour aller vivre au soleil du côté de Perpignan, mais son absence fut de courte durée, car elle ne pouvait se résoudre à vivre loin de sa famille et de ses amis.

Au sein de la SBM elle fut membre du Conseil d'Administration de 1976 à 1999 et occupa la vice-présidence de notre société, durant quelques années.

Nous tenons à présenter au nom de la Société Belge de Malacologie nos plus sincères condoléances à sa famille et tout spécialement à ses trois filles.

Personnellement, nous gardons un souvenir ému d'un couple d'amis avec qui nous entretenions des relations privilégiées.

Ralph Duchamps

Assemblage de ARION revue de la Soc. Belge de Malacologie le 2 août 1990. Dans le fond, à gauche une vitrine contenant une partie de la collection de coquillages de Madame Milou Bresson.

Quelques nouvelles publications

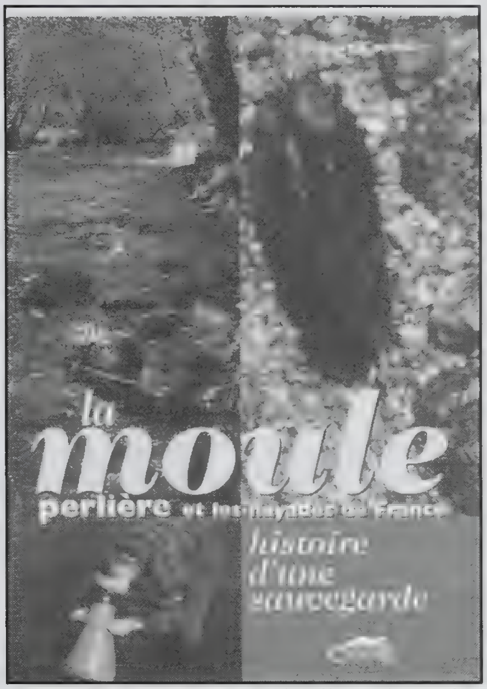
Claude VILVENS, Roland HOUART & Etienne MEULEMAN

LA MOULE PERLIERE ET LES NAYADES DE FRANCE
Histoire d'une sauvegarde

par **Gilbert Cochet** (dessins de Noël Gouilloux)

pp. 1-32, nombreuses photographies et gravures couleurs.
Format 17 x 24 cm, couverture souple.
Prix: 7.20 EUR

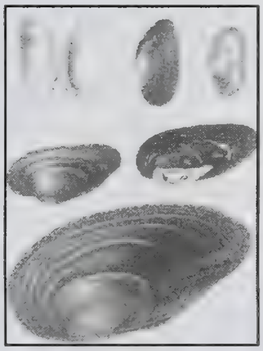
Edition Catiche Productions
Renseignements: caticheprod@wanadoo.fr



Depuis 2 ou 3 ans, on parle beaucoup de la Moule perlière : sans doute les préoccupations environnement de plus en plus pressantes n'y sont-elles pas étrangères (voir la rubrique "Morceaux choisis" avec Natagora) ...

C'est donc sans trop de surprise que j'ai découvert, bien en évidence, ce petit fascicule dans le vaste choix de livres proposés par la Maison liégeoise de l'environnement (endroit magnifique pour le naturaliste ☺).

Dans un langage clair et avec de belles illustrations, l'auteur nous explique en détail la situation des grands bivalves d'eau douce, accessoirement susceptibles de fabriquer des perles. Ainsi, la première partie de l'ouvrage (la plus étendue) décrit tout ce qui touche la Moule perlière proprement dite, soit *Margaritifera margaritifera* : charnière (avec deux dents cardinales sur la valve gauche, une sur la droite), siphons postérieurs inhalant (bordé de papilles brunes) et exhalant (à bord lisse), reproduction et développement de larves glochidies qui se fixent sur les branchies de salmonidés (exclusivement le saumon atlantique et la truite fario) avant que les jeunes moules rejoignent le fond. Le rôle de bio-indicateur est bien mis en évidence : une moule adulte filtre 50 litres d'eau par jour ! Mais elle réclame des cours d'eau oligotrophes de préférence en terrains siliceux : autrement dit, la présence de nitrates ou de phosphates (provenant notamment des techniques agricoles) lui est fatale. De plus, elle a besoin d'un fons à sédiments meuble pour permettre l'enfoncement : si donc le transport des sables et des graviers est entravé par des barrages ou des rectifications de cours, le comatage résultant sera négatif pour notre moule. Après une étude de sa répartition passée et présente, les causes du déclin sont passées en revue, en plus de celles déjà signalées : pollution et recalibrage des cours d'eau mais aussi récoltes des moules pour leur perle et introduction du rat musqué.



La deuxième héroïne est la Grande mulette (*Pseudounio auricularius*) à la lourde coquille (avec des lents latérales en plus des cardinales). Sa reproduction utilise également des poissons hôtes, comme l'esturgeon. Elle a les mêmes exigences que la Moule perlière, avec les mêmes facteurs de danger.

Enfin, un panorama général des nayades (grands bivalves dulcicoles de type Unionidae et Maragaritiferidae) de France est brossé. L'ouvrage se termine avec des considérations sur les parures et les perles et un appel pour une tentative de sauvegarde des ces belles espèces de Mollusques dulcicoles.

Pour le prix très modique que j'ai déboursé, j'ai appris beaucoup de choses : vous pouvez en faire autant ;-) !

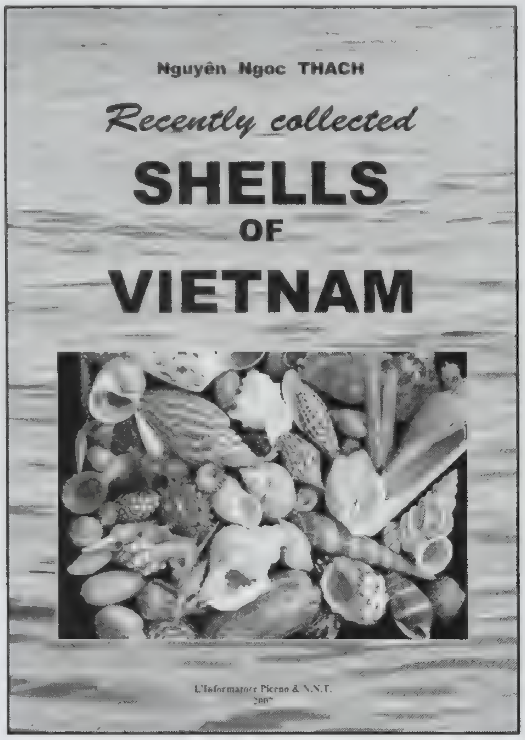
Claude Vilvens

RECENTLY COLLECTED SHELLS OF VIETNAM

par **Nguyèn Ngoc THACH**

pp. 1-263 + 118 planches couleurs.
Format: 215 x 300 mm, couverture carton rigide.
Prix non communiqué.

Mostra Mondiale Malacologica: malacologia@fastnet.it
Publié par: L'Informatore Piceno & N.N.T. 60124 Ancona, Italie.



Quatre ans après son livre intitulé "Shells of Vietnam", le Dr. Thach nous revient avec cet ouvrage de 263 pages agrémenté de nombreuses planches couleurs pour un total de près de 2000 figures, afin de nous présenter les coquillages récoltés récemment au Vietnam. L'ouvrage traite essentiellement des coquilles marines, même si deux planches sont dédiées à quelques espèces terrestres. Les deux livres se complètent très bien car si quelques espèces présentes dans le premier volume sont à nouveau illustrées ici, la plupart des coquilles n'y figuraient pas.

Un préface nous résume le contenu du livre et nous présente la région explorée. Les remerciements d'usage sont suivis de la liste des localités citées tout au long des descriptions. Il est par ailleurs dommage que la carte figurant dans le premier volume ne soit plus reproduite ici, un oubli probablement, néanmoins facilement contournable. L'auteur nous présente ensuite quelques espèces terrestres photographiées *in situ* et des coquilles marines avec l'animal et illustre les principaux opercules. Il nous montre aussi quelques timbres vietnamiens ayant des mollusques comme motif et illustre les espèces décrites récemment du Vietnam, ainsi que quelques coquilles senestres et hybrides.

L'auteur passe ensuite à la classification des mollusques vietnamiens avant de nous emmener vers la partie systématique. Les espèces sont présentées avec le nom d'auteur, la date de description, la synonymie la plus courante et le nom vernaculaire vietnamien. Une courte description accompagnée de la taille moyenne de l'espèce, de l'habitat, de la distribution au Vietnam et de la fréquence termine chaque présentation. Quelques centaines d'espèces récemment récoltées sont ainsi décrites. Le livre se termine par une bibliographie de 12 pages listant des livres ou des articles, pour la plupart récents (de 1950 à nos jours), par une liste des familles illustrées sur les quelques 108 planches et par un index des noms anglais, vietnamiens et scientifiques. Les planches 1 à 79 illustrent la plupart des espèces tandis que les planches 80 à 118, figurant quelques 612 coquilles, illustrent surtout les variations intra-spécifiques.

Si vous possédez le premier volume intitulé "Shells of Vietnam" n'hésitez pas à vous procurer son deuxième ouvrage si vous voulez un aperçu complet des mollusques marins de cette région. Si vous ne possédez pas le premier volume, offrez-vous quand même celui-ci, vous ne le regretterez pas, et puis… faites-vous offrir le premier ! Bonne lecture.

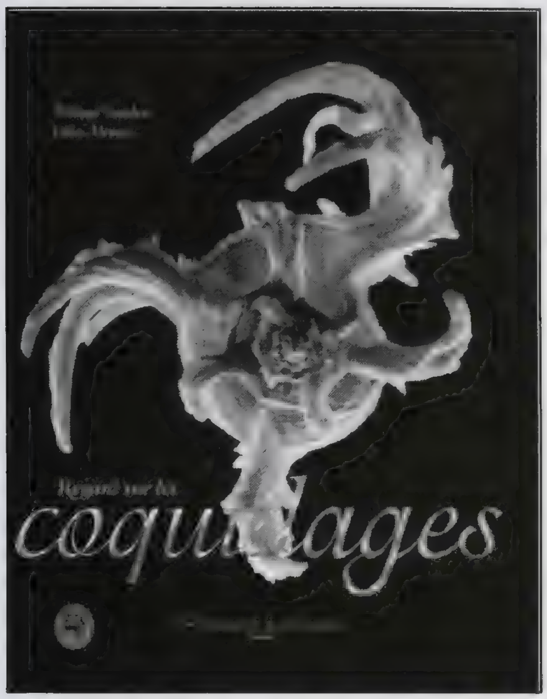
Roland Houart

REGARD SUR LES COQUILLAGES

par **Philippe BOUCHET et Gilles MERMET**

pp. 1-162, nombreuses illustrations couleurs.
Format: 250 x 320 mm, couverture carton rigide.

Prix: 49 € + frais d'envoi. Imprimerie Nationale/Actes Sud, 13200 Arles, 2007.



Quand un malacologue et un photographe se rencontrent et décident de mettre leur "art" en commun, cela ne peut nous donner que du plaisir. Le plaisir de la lecture et le plaisir des yeux! "Regard sur les coquillages" est une introduction et une promenade dans le monde des mollusques et des coquillages, ou comme le souligne très bien Philippe Bouchet " ... le partage d'une passion qui le fait courir depuis toujours".

Mollusques ... coquillages ... coquilles ... conchyliologue ... malacologue ... Quelle est la signification de ces termes? Leurs différences? Tant de questions, tant d'interrogations que Philippe Bouchet, directeur du laboratoire de malacologie au Muséum national d'histoire naturelle de Paris, aborde et commente dans son livre.

Les illustrations de Gilles Mermet sont un délice pour les yeux. Page après page, chapitre après chapitre, on découvre ou on redécouvre ces joyaux de la nature sous forme de photos et grâce à la plume "magique" de Philippe Bouchet qui allie l'art de raconter l'histoire et de captiver le lecteur.

Le livre se divise en 6 chapitres. Le premier, intitulé prosaïquement "Vous êtes ici", nous fait découvrir le "petit" monde des mollusques et de la recherche. "Explorer et découvrir" comme l'indique son nom, nous emporte ensuite vers les explorations lointaines (et moins lointaines) qui permettent de découvrir une faune particulièrement intéressante et/ou encore inconnue, dans les forêts tropicales, sur les récifs coralliens ou dans les profondeurs abyssales. Philippe dirige également la mission d'exploration de la faune marine du Pacifique Sud et participe régulièrement, depuis de nombreuses années, aux différentes missions mises sur pied par le MNHN et l'IRD (Institut de recherche pour le développement), basé en Nouvelle-Calédonie. Qui donc est mieux placé que lui pour nous en parler et nous faire vivre ses rêves, ses espoirs, ses découvertes, ses cris de victoires, le mode de vie à bord d'un navire de recherches, le tri, la dispersion vers les différents spécialistes de par le monde et *in fine,* la publication du résultat de multiples recherches.

Le monde de la systématique est abordé dans le chapitre suivant intitulé "Nommer"…, tout un programme. Les auteurs y commentent le code de nomenclature zoologique, le nom des espèces et la formation des noms scientifiques (pour l'anecdote je ne savais pas que quelqu'un avait nommé une espèce *Allo allo* ou bien encore *Abra cadabra* ...).

Le chapitre intitulé "Au Muséum et nulle part ailleurs" nous fait découvrir la richesse des collections du MNHN, de sa typothèque et leurs sources d'approvisionnement. Je ne pourrai vous résumer ce que Philippe Bouchet nous dévoile sur les quelques 9 pages de texte, mais je vous laisse le soin de le découvrir par vous-même.

Dans le chapitre suivant "les collectionneurs sont-ils environnementalement incorrects" les auteurs mettent l'accent sur la fréquence des espèces et définissent les termes "espèces communes", "peu communes", "rares" et/ou "menacées d'extinction". Certaines causes d'extinction ou de raréfaction sont analysées de façon approfondie. Leur conclusion, basée sur cette analyse, me semble correcte et pleine de bon sens, du moins dans le domaine qui nous préoccupe ici, même si moi aussi, dans ce cas bien précis, je ne suis sans doute pas entièrement impartial.

Le dernier chapitre est consacré aux musées et à l'utilité des collections qu'ils abritent. Ici non plus je ne vais pas vous résumer ces pages, mais je vous laisserai découvrir ce que les auteurs, et en particulier Philippe Bouchet, en disent.

Que vous dire en guise de conclusion, celle-ci s'impose d'elle-même: faites-vous ce plaisir, offrez-vous ce livre et dévorez-le de la première à la dernière page, vous en ressortirez plus riche en connaissances et heureux de constater que nous collaborons pour la plupart un peu (ou un peu plus) à la recherche dans le domaine malacologique.

Roland Houart

COQUILLAGES

par **Paul Starosta et Jacques Senders**

pp. 1-384, nombreuses photographies couleurs. Edition du SEUIL
Format 24 x 34 cm, couverture cartonnée.
Prix: 59 euros + frais d'envoi.

COQUILLAGES

Qui ne connaît Jacques Senders, chimiste de profession, naturaliste dans l'âme, grand voyageur et collectionneur devant l'Eternel. Ses nombreux voyages circum-mondiaux et ses plongées sous-marines lui ont permis d'observer d'innombrables formes vivantes *in situ* et de rassembler une collection de coquillages mariant esthétisme et valeur scientifique.
Ses connaissances en la matière lui ont d'ailleurs permis de découvrir de nouvelles espèces qu'il mit à la disposition du monde scientifique, nous valant quelques descriptions très intéressantes.
Jacques est également l'auteur, avec son épouse Rita, de "Guide des coquillages de collection" publié chez Duculot et avec Guido Poppe, de "An annoted price catalogue of marine shells" publié chez l'Informatore Piceno, Ancona. Il fut également vice-président de la Société Belge de Malacologie.
Ce livre, Jacques le voulait pour mettre en image les plus beaux coquillages de sa collection, encore fallait-il faire un choix parmi les quelques centaines de splendides pièces garnissant tiroirs et vitrines. Pour ce faire il s'allia à Paul Starosta, biologiste de formation, naturaliste dans l'âme également et photographe professionnel depuis plus de vingt ans. A deux ils nous offrent un ouvrage imposant et magnifiquement illustré.
Dans un préface de quelques 11 pages, Paolo Portoghesi nous trace l'histoire de la conchyliologie et de la malacologie depuis Aristote jusqu'à nos jours, ses origines, ses légendes, ses … poètes, son implication dans les religions, et même, et surtout, dans l'architecture. L'introduction prend la suite avec quelques titres accrocheurs tels "autopsie d'un coquillage", "de la tête au pied", "un manteau magique", "armure, camouflage et fuite", pour ne citer que ces quatre là.
Sur plus de 330 pages nous pouvons ensuite admirer les pièces choisies par les auteurs, très souvent présentées en pleine page couleur (24 x 34 cm), quelquefois en demi-page. Toutes les coquilles sont splendidement illustrées. Pour les gastéropodes d'abord, le photographe fait intervenir un jeu d'ombres et de lumière et y réussit pleinement avec *Cassis norai, Cypraea aurantium* et autres *Charonia tritonis*. Les terrestres se partagent une vingtaine de pages, en laissant ensuite la place aux bivalves marins, illustrés par 36 photographies, pour se clôturer par les Argonautidae, les Nautilidae, les Spirulidae, les Dentaliidae et les chitons.
Le livre se termine par quelques données scientifiques se résumant à la présentation des différentes classes de mollusques et des familles illustrées, et par un index des noms scientifiques.
Un volume qui nous ravira par ses splendides illustrations et qui tiendra une place de choix chez chacun de nous.

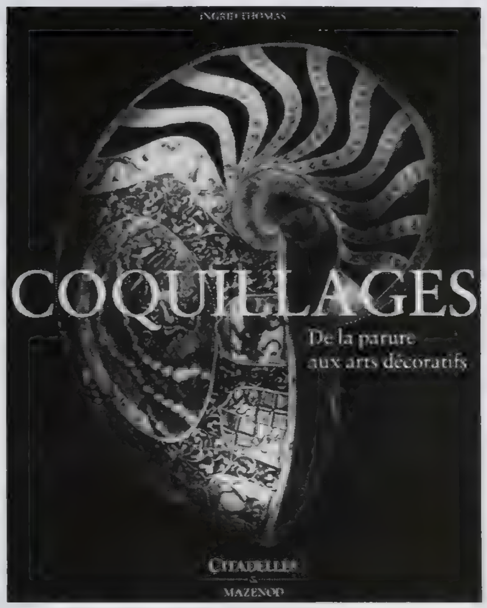
Roland Houart

COQUILLAGES

De la parure aux arts décoratifs

par Ingrid Thomas

pp. 1-256, nombreuses photographies couleurs de grande qualité. Format 25.5 x 32.5 cm, couverture rigide. Prix : 65 euros (prix indicatif payé à la librairie du Musée du quai Branly à Paris)	Edition Citadelles & Mazenod (www.citadelles-mazenod.com) ISBN : 978-2-85088-237-1



Ce très beau livre nous fait découvrir ou redécouvrir toutes les utilisations des coquilles par les hommes. Après une introduction sur les relations entre l'homme et la coquille, l'utilité du coquillage, la symbolique, … l'auteur nous emmène en voyage en balayant tout les domaines d'utilisation. En six chapitres, nous découvrons les coquillages taillés, les bijoux de coquillages, le coquillage dans l'art, les créations en coquillages, le coquillage en architecture et les coquillages dans les arts décoratifs.

A la fin du livre, nous trouvons une série de renseignements très utiles sur les collections publiques, les grottes de coquillages ou encore la littérature ou les sites Internet disponibles. En parlant des sites Internet, je ne peux m'empêcher de citer l'introduction de ce petit chapitre : « La liste des sites Internet ci-dessous n'entend pas être exhaustive. On y trouvera cependant les plus importants sites internationaux non commerciaux qui dispensent une information sur la collecte des coquillages et l'étude des mollusques ». Il me plaît de citer cette introduction vu que le site de la S.B.M. y est repris en deuxième position ;-) Chouette non !

Bref, un livre qui doit figurer dans la bibliothèque d'un malacologue tant pour la beauté de ses images que par la qualité des renseignements qu'il renferme. Bonne lecture et bon voyage au pays des coquillages !

Etienne Meuleman

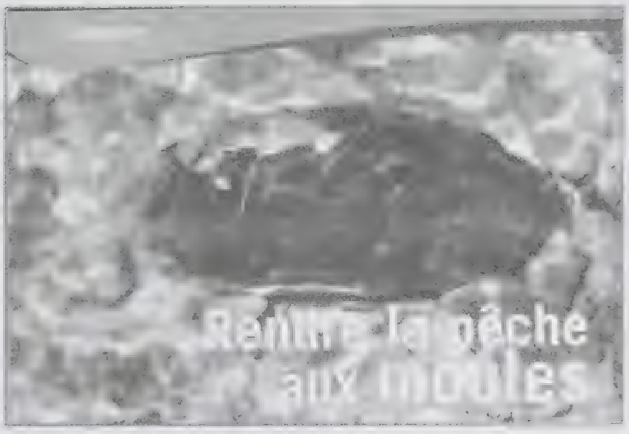
Morceaux choisis

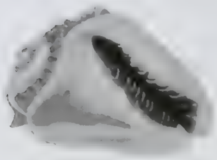
Claude VILVENS

Voici quelques articles concernant les Mollusques et la biodiversité parues ces derniers mois dans diverses revues. Une copie disponible à la bibliothèque de la SBM.

Natagora : n°22 – novembe-décembre 2007 – Rendre la pêche aux moules par **Gregory Motte** (pp.22-25)

Grégory Motte, bien connu dans les milieux naturalistes, a coordonné un projet **LIFE Nature** (c'est-à-dire visant à la conservation de la nature sur des sites **Natura 2000**) dans lequel plusieurs personnes ont œuvré à éviter la disparition de la Moule perlière (*Margaritifera margaritifera*) dans les cours d'eau des Ardennes et de l'Eifel. Après avoir rappelé la recherche effrénée des perles produites par cette moule au cours des 19ème et 20ème siècle, ainsi que son mode de reproduction avec développement de larves qui se fixent sur les branchies de salmonidés (ce qui est une symbiose, car la moule secrète une substance qui protège la truite des champignons), l'auteur en vient à ce qui justifie probablement l'intérêt pour cette moule : son rôle de bio-indicateur pour la qualité de l'eau qui l'héberge. Vu ses exigences, il a fallu convaincre les agriculteurs de clôturer les berges et d'installer des abreuvoirs (pour éviter le colmatage des fonds suite au piétinement par le bétail), les forestiers de retirer des résineux de fonds de vallée et envisager une campagne visant à limiter les épandages de fertilisants et de pesticides. Ce dernier objectif implique d'y consacrer des moyens auxquels la Région Wallonne et le Parc Naturel Hautes-Fagnes-Eifel contribueront. C'est en fait tout un biotope qui s'en trouvera ainsi protégé, pour le bénéfice non seulement de la Moule perlière et de la Mulette épaisse, mais des poissons, des oiseaux (cincle plongeur, martin-pêcheur, cigogne noire), de la loutre et des papillons (nacré, cuivré de la bistorte).





Nous avons reçu

Claude VILVENS

LES NATURALISTES DE LA HAUTE LESSE

(Belgique)
N°238, novembre-décembre 2007

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2. **Sommaire**
3. **Informations diverses**
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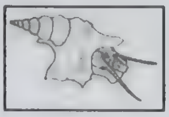

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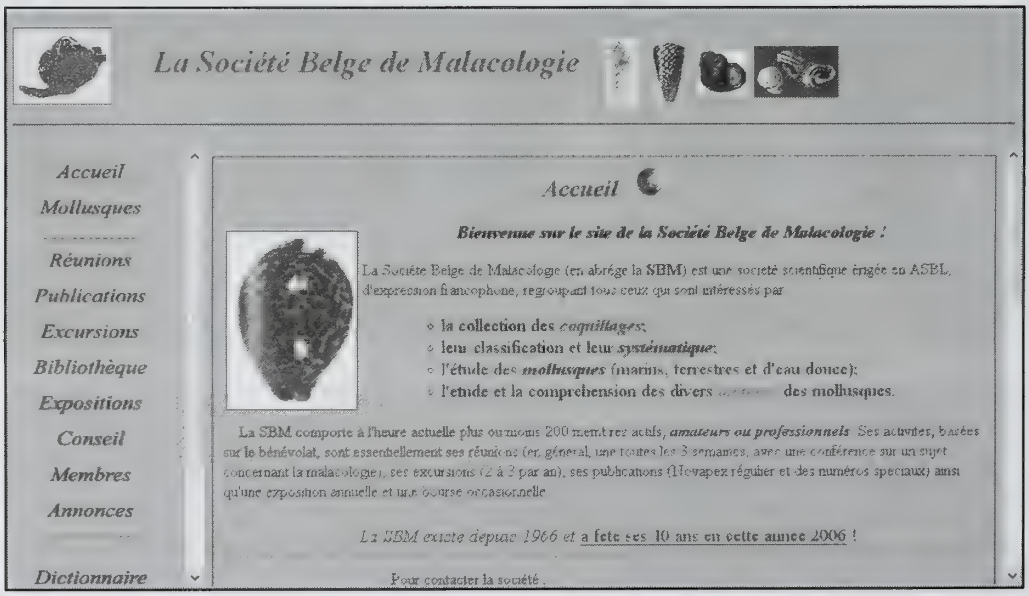

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Pour contacter la société .

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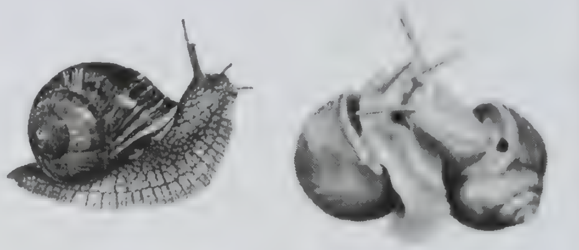

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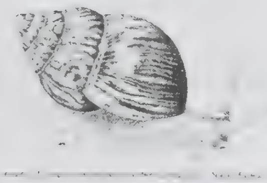

Grandes marées de l'année 2008

Christiane DELONGUEVILLE et Roland SCAILLET

L'année 2008 s'annonce assez médiocre avec un coefficient de 109 au maximum en avril. Le début de l'année (mars - avril - mai) et le mois d'octobre permettront néanmoins quelques rares observations. Ne ratez pas ces opportunités car il n'y en aura guère d'autres…

Coefficients (> 100) des pleines mers à Brest

(Les marées basses correspondantes sont donc particulièrement intéressantes à prospecter.)

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Février	-	-
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	Lundi 10	106 - 104
	Mardi 11	101 - (96)
Avril	Dimanche 6	104 - 107
	Lundi 7	109 - 109
	Mardi 8	108 - 105
	Mercredi 9	101 - (95)
Mai	Lundi 5	100 - 103
	Mardi 6	104 - 104
	Mercredi 7	103 - 100
Juin	-	-
Juillet	-	-
Août	Dimanche 3	100 - 100
	Dimanche 31	(98) - 101
Septembre	Lundi 1	101 - 101
	Mardi 16	(98) - 100
	Mercredi 17	101 - 101
	Jeudi 18	100 - (97)
Octobre	Mercredi 15	100 - 102
	Jeudi 16	103 - 103
	Vendredi 17	101 - (98)
Novembre	Vendredi 14	100 - 100
Décembre	-	-

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2. Observez, photographiez et n'échantillonnez que le strict nécessaire.
3. Remettez toujours les pierres déplacées en place et obligatoirement dans le bon sens.
4. Renseignez-vous sur l'heure et la hauteur exacte de la marée basse à l'endroit où vous vous trouvez.
5. Surtout ne commettez pas d'imprudence, évitez les pièges et soyez vigilants.

Bonnes marées !

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SOCIETE BELGE DE MALACOLOGIE

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Update of Muricidae (excluding Coralliophilinae) from French Polynesia with description of ten new species

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KEYWORDS. French Polynesia, Muricidae, update, new species.

ABSTRACT. The French Polynesian species of Muricidae are reviewed and updated. A total of 116 species is recognized; 10 of those are described as new to science: *Poirieria (Paziella) tanaoa* n.sp., *Orania atea* n.sp. and *Pagodula atanua* n.sp. from the Marquesas Archipelago, *Aspella lozoueti* n.sp. from Rapa, *A. hildrunae* n.sp. and *A. helenae* from the Society Archipelago, *Favartia (F.) salvati* n.sp., *F. (F.) nivea* n.sp., *F. (Pygmaepterys) avatea* n.sp. and *Orania maestratii* from the Austral Archipelago. Four additional species remained unidentified.
The subfamily Typhinae is recorded for the first time from French Polynesia.
Favartia lillouxi Myers & Hertz, 1999 is considered as a new synonym of *F. conleyi* Houart, 1999 and *F. guamensis* Emerson & D'Attilio, 1979 is separated from *F. crouchi* (Sowerby, 1894).
Tables listing the species and their occurrence in the different Polynesian archipelagos are given for each subfamily. Twenty-six species are considered to be endemic.

RESUME. Révision et mise à jour des espèces de Muricidae de Polynésie Française. Sur les 116 espèces reconnues, 10 sont décrites comme nouvelles pour la science: *Poirieria (Paziella) tanaoa* n.sp., *Orania atea* n.sp. et *Pagodula atanua* n.sp. des Marquises, *Aspella lozoueti* n.sp. de Rapa, *A. hildrunae* n.sp. et *A. helenae* des Iles de la Société, *Favartia (F.) salvati* n.sp., *F. (F.) nivea* n.sp., *F. (Pygmaepterys) avatea* n.sp. et *Orania maestratii* des Iles Australes. Quatre espèces demeurent indéterminées.
Pour la première fois, la sous-famille des Typhinae est citée de Polynésie Française.
Favartia lillouxi Myers & Hertz, 1999 est considérée comme synonyme de *F. conleyi* Houart, 1999 et *F. guamensis* Emerson & D'Attilio, 1979 est séparée de *F. crouchi* (Sowerby, 1894).
Des tableaux présentent une liste des espèces dans chaque sous-famille avec leur répartition par archipel. Vingt-six d'entre elles sont considérées comme endémiques de Polynésie Française.

INTRODUCTION

Since the 18th century, many expeditions have contributed to the collecting and to the knowledge of marine molluscs of French Polynesia. The first important work drawing up an inventory of the malacological fauna of the area (Fig. 1) is that of Dautzenberg & Bouge (1933); it was followed by Salvat & Rives (1975) and by Richard (1985). Taking into account these studies and recent records, Tröndlé & Houart (1992) revised the Muricidae from French Polynesia. They commented and illustrated 74 species. The same authors (Houart & Tröndlé, 1997), in an addition to the former work, added 7 species to the previous total, giving a total of 81 species of Muricidae (excluding Coralliophilinae) for French Polynesia.
Recently, the MNHN, in collaboration with IRD, organized MUSORSTOM 9. This mission was a very thorough one, having as its objective an inventory of the molluscs from the Marquesas. It consisted of a sea campaign (August-September 1997) with 168 dredgings and trawls, and of a workshop at Ua Huka (September-October 1997) with 40 stations of sampling by diving and hand dredging. Another important mission was carried out in the Austral Archipelago, involving the University of Polynesia, EPHE, IRD and MNHN. It consisted of the BENTHAUS campaign with dredgings and trawls between 50 and 1200 meters, and the "Atelier Rapa

2002" covering the littoral zone down to 52 m (99 stations: 55 by diving, 24 by dredging, and 20 hand collecting).

The present study is based mainly on a large amount of material obtained from these two expeditions and a few private collections (MB, JT, RH), and adds some 35 species of which 10 are described for the first time. All photographs were taken by R. Houart, unless otherwise indicated.

Abbreviations and text conventions

Depositories

AMS: The Australian Museum, Sydney, Australia.
ANSP: Academy of Natural Sciences of Philadelphia, U.S.A.
BMNH: The Natural History Museum, London, U.K.
FMNH: Florida Museum of Natural History, Gainesville, U.S.A.
IRSNB: Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgium.
JT: in collection Jean Tröndlé.
MB: in collection Michel Boutet.
MNHN: Muséum national d'Histoire naturelle, Paris, France.
NM: Natal Museum, Pietermaritzburg, South Africa.
NMNZ: Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand.
NSMT: National Science Museum, Tokyo, Japan.
RH: in collection Roland Houart.
SBMNH: Santa Barbara Museum of Natural History, California, U.S.A.
SMNH: Swedish Museum of Natural History, Stockholm, Sweden.
USNM: National Museum of Natural History, Washington, D.C., U.S.A.

Tables

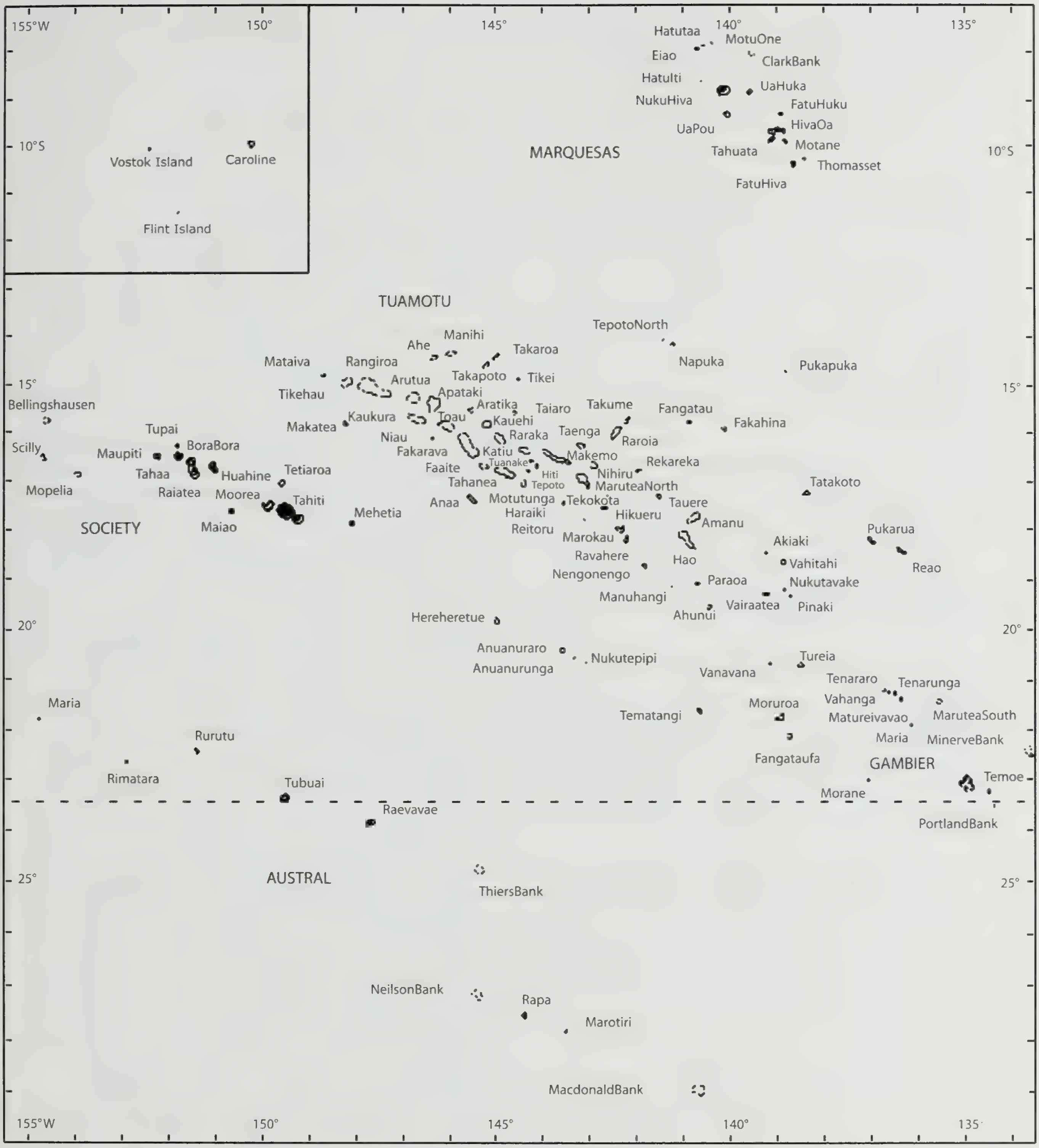
SCT: Society Islands
TMT: Tuamotu Archipelago
MRQ: Marquesas Islands
GMB: Gambier Archipelago
AUS: Austral Archipelago
RAP: Rapa
EXP: Expeditions
END: endemic.

Other abbreviations

ad.: adult.
dd: empty shell.
lv.: collected alive.
CAS: Casier (lobster pot)
CP: Chalut à perche (beam trawl)
DR: Drague à roches (rocks dredge)
CRIOBE: Centre de Recherches Insulaires et Observatoire de l'Environnement
DW: Drague Warén (Warén dredge)
EPHE: École Pratique des Hautes Études, Perpignan, France
IRD: Institut de Recherche pour le Développement, Noumea, New Caledonia (formerly ORSTOM).

Terminology used to describe the spiral cords and apertural denticles (after Merle, 1999 and 2001)

P :	Primary cord
s :	secondary cord
t :	tertiary cord
ad :	adapical (or adapertural)
ab :	abapical (or abapertural)
SP:	Subsutural cord
IP :	Infrasutural primary cord (primary cord on shoulder)
adis :	adapical infrasutural secondary cord (shoulder)
abis :	abapical infrasutural secondary cord (shoulder)
P1 :	Shoulder cord
P2-P6 :	Primary cords of the convex part of the teleoconch whorl
s1-s6 :	secondary cords of the convex part of the teleoconch whorl
example: s1 = secondary cord between P1 and P2; s2 = secondary cord between P2 and P3, etc.	
ADP :	adapertural primary cord on the siphonal canal
MP :	median primary cord on the siphonal canal
ABP :	abapertural primary cord on the siphonal canal
ads :	adapertural secondary cord on the siphonal canal
APERTURE	
ID:	Infrasutural denticle
D1 to D6:	Abapical denticles


155°W
150°
145°
140°
135°
10°S
15°
20°
25°
Vostok Island
Caroline
Flint Island
Hatutaa
MotuOne
Eiao
ClarkBank
Hatulti
UaHuka
NukuHiva
FatuHuku
UaPou
HivaOa
MARQUESAS
Tahuata
Motane
Thomasset
FatuHiva
TUAMOTU
TepotoNorth
Manihi
Ahe
Takaroa
Mataiva
Rangiroa
Napuka
Pukapuka
Arutua
Takapoto
Tikei
Tikehau
Apataki
Bellingshausen
Aratika
Taiaro
Takume
Fangatau
Kaukura
Toau
Kauehi
Fakahina
Makatea
Tupai
Niau
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Raroia
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BoraBora
Maupiti
Fakarava
Katiu
Makemo
Rekareka
Tahaa
Huahine
Tetiaroa
Faaite
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Reao
Nengonengo
Paraoa
Nukutavake
Manuhangi
Vairaatea
Pinaki
Hereheretue
Ahunui
Anuanuraro
Nukutepipi
Tureia
Anuanurunga
Vanavana
Tenararo
Tenarunga
Maria
Vahanga
Moruroa
Tematangi
Matureivavao
MaruteaSouth
Rurutu
Maria
MinerveBank
Fangataufa
Rimatara
GAMBIER
Tubuai
Temoe
Morane
Raevavae
PortlandBank
AUSTRAL
ThiersBank
NeilsonBank
Rapa
Marotiri
MacdonaldBank

Figure 1. Map of French Polynesia (courtesy of J. Poupin)

SYSTEMATICS

Family MURICIDAE Rafinesque, 1815
Subfamily Muricinae Rafinesque, 1815

Remarks. There are additions and modifications since the publication of Tröndlé & Houart (1992) and Houart & Tröndlé (1997). Eight species are being added, of which three are new: *Poirieria (Paziella) tanaoa* from the Marquesas, *Aspella lozoueti* from Rapa and *A. helenae* from the Society Archipelago. A species recorded in Tröndlé & Houart (1992: 80) as *Aspella platylaevis* was misidentified by us in 1992 and is now described as a new species, *A. hildrunae* n.sp. It occurs in the Society Archipelago, in the Tuamotus, in Gambier and in Rapa.
It remains surprising and interesting to continue to note the absence of any species of *Murex* s.s. from French Polynesia. Ponder & Vokes (1988) recorded Tonga as the eastern limit of *Murex tenuirostrum* (Lamarck, 1822) and *Murex aduncospinosus* (Sowerby, 1841) in the Pacific Ocean (see Table 3).

Chicoreus (Triplex) torrefactus (Sowerby, 1841)

Chicoreus (Triplex) torrefactus Sowerby, 1841: pl. 199, fig. 120.

Material examined. Society Archipelago, Tahiti, Arue, 50-60 m, 1 dd, MB.

Distribution. Throughout the Indo-West Pacific.

Remarks. The name applied here seems to be the most appropriate for a small juvenile with intact protoconch collected off Tahiti. This species was already listed by Dautzenberg & Bouge (1933) but no recent records were mentioned until now. The specimen listed here was collected dead and worn.

Naquetia barclayi (Reeve, 1858)

Figs 87-88

Murex barclayi Reeve, 1858 : 209, pl. 38, fig. 2.
Pterynotus annandalei Preston, 1910 : 119, fig. 3.

Material examined. MUSORSTOM 9, Marquesas, Ua Pou, stn CP1265, 9°20.4' S, 140°07.3 W, 90-92 m, 1 dd, MNHN.

Distribution. Throughout the Indo-West Pacific.

Remarks. Houart (1992: 127) recorded no specimens closer than southern Queensland, Australia. The record of *N. barclayi* in the Marquesas extends its geographical range considerably.

Poirieria (Paziella) tanaoa n. sp.

Figs 32-35

Type material. MUSORSTOM 9, Marquesas, Nuku Hiva, stn DR1299, 8°49' S, 140°17' W, 405-418 m, holotype MNHN; paratypes: MNHN 20160: 6; RH: 1 (all dd).

Type locality. Marquesas, Nuku Hiva, stn DR1299, 8°49' S, 140°17' W, 405-418 m.

Distribution. Marquesas Archipelago, Nuku Hiva, 405-418 m.

Description. Shell small, up to 10.1 mm in length at maturity, biconical, heavy, lamellose, weakly spinose. Shoulder weakly sloping, slightly concave. White.
Spire high with 1-1.25 protoconch whorls and teleoconch of up to 5 angulate, strongly shouldered whorls. Suture impressed, partially obscured by small axial lamellae of following whorl. Protoconch small; whorls rounded, smooth; terminal lip unknown (eroded).
Axial sculpture of teleoconch whorls consisting of high, strong, broad, lamellose varices, each with a single, short, open primary spine at shoulder. No other axial sculpture. First whorl with 8 varices, second 9, third 9 or 10, fourth 9, last whorl with 7 or 8 varices. Spiral sculpture of low primary cords: spire whorls with narrow IP, last whorl with IP and very low or obsolete P1.
Aperture small, angulate, narrow; columellar lip narrow, smooth, adherent; anal notch shallow, broad; outer lip broad, weakly erect, smooth, with 3 strong, broad denticles within (Fig. 35): D1 broad, largest denticle; D2 and D3 of same strength or decreasing in strength abapically. Siphonal canal short, broad, straight, broadly open, with low lamellae over whole length.
Operculum and radula unknown.

Remarks. With the exception of *P. galapagana* (Emerson & D'Attilio, 1970) described from the Galapagos Islands, *P. tanaoa* n.sp. is the first record of a primitive (living) species of *Paziella* in the Indo-Pacific. However, *P. galapagana* is more akin to the Caribbean *P. pazi* (Crosse, 1869) group, which Vokes (1992: 33) placed in her "Species Group 3", together with *P. nuttingi* (Dall, 1896) and *P. oregonia* (Bullis, 1964).
Poirieria (Paziella) tanaoa is obviously related to primitive species such *as P. levis* Traub, 1979 from the Lower Ypresian (Eocene) of Austria (Merle & Pacaud, 2002), *P. cretacea* Garvie, 1991 from the Maastrichtian beds (Cretaceous) of Eastern Texas or *P. harrisi* Vokes, 1970 from the Paleocene of Alabama (Vokes, 1992).

Etymology. Tanaoa, in the Marquesas mythology, is the god of primeval darkness, confined to the depths of the ocean.

Pterymarchia aparrii (D'Attilio & Bertsch, 1980)
Fig. 36

Pterynotus aparri D'Attilio & Bertsch, 1980 : 172, figs 2 a-d.

Material examined. BENTHAUS, Austral Archipelago, stn DW1914, 27°03.52' S, 146°04.01' W, 150 m, 1lv, MNHN.

Distribution. To our knowledge, *P. aparrii* is known as occurring in the Bohol Straits, Philippine Islands. One other specimen was recorded from the Coral Sea, in 80-120 m by Houart (1987: 762, fig. 5). Its geographical distribution is greatly extended with this single record from the Austral Archipelago.

Aspella helenae n. sp.
Figs 2, 26, 46-48

Type material. French Polynesia, Society Archipelago, Tahiti, Afaahiti, sediments, dd, holotype MNHN 20166; Tahiti, Arue fault, 10-20 m, dd, 1 paratype RH; 1 paratype MB.

Type locality. French Polynesia, Society Archipelago, Tahiti, Afaahiti, sediments.

Distribution. Society Archipelago, Tahiti, Afaahiti and Arue fault, in 10-60 m (dd).

Description. Shell small for the genus, up to 9.6 mm in length at maturity (paratype MB), slender, lanceolate, flat, weakly nodose. Shoulder slightly convex. Length/width ratio 2.17-2.25. White, covered by white or light cream cancellate intritacalx (Fig. 26). Aperture light cream.

Spire very high, acute, with 1.5 protoconch whorls (Fig. 2) and teleoconch up to 6 broad, flattened, nodose whorls. Suture impressed, partially obscured by narrow buttress connected to preceding whorl. Protoconch large, broad. Whorls rounded. Terminal lip thin, raised, slightly curved.

Axial sculpture of teleoconch whorls consisting of high varices. First and second whorls with six almost evenly sized varices, third and fourth whorl with ventral and dorsal varices reduced to low, almost indistinguishable axial ribs, with small, narrow buttress connecting to preceding whorl. Penultimate and last whorls with ventral and dorsal narrow buttresses, and narrow, high, lateral varices. Second and fifth varices high, slightly lower than lateral ones. Spiral sculpture of broad, occasionally slightly nodose low cords, indistinguishable on first two teleoconch whorls. P1 and P2 visible on third whorl, P1, P2 and P3 on fourth, P1-P4 on penultimate, and 1-6 on last whorl. All cords evenly broad. Last whorl with P1-P3 most obvious, P4 very low, P5 and P6 almost indistinguishable.

Aperture small, narrow, ovate. Columellar lip narrow, smooth, rim partially weakly erect abapically, adherent at adapical extremity. Anal notch indistinguishable. Outer lip weakly erect with 5 or 6 moderately strong, broad denticles within: D1-D6. D3 and D4 probably fused in paratype RH, D6 split in paratype MB. Siphonal canal moderately long, narrow, slightly recurved dorsally, open.

Operculum and radula unknown.

Remarks. *Aspella helenae* n.sp. differs from all its congeners in having a cancellate intritacalx, together with a broad, rounded, paucispiral protoconch consisting of 1.5 whorls, a flat shell with an ovate aperture, and narrow buttresses connecting to the teleoconch whorls. It also differs in the spiral cords morphology (see Table 1).

Aspella hildrunae n.sp. from French Polynesia differs in having a more irregularly sculptured intritacalx, a conical protoconch of 2-2.15 whorls, a broader and smoother shell and broader buttresses, twice the size of those of *A. helenae*.

Aspella lozoueti n.sp. from Rapa differs in having a smoother intritacalx, a comparatively broader aperture, a shorter and broader siphonal canal, more rounded, broader and lower varices, and much broader buttresses, twice the size of those of *A. helenae*.

Aspella platylaevis differs in having a very different smooth intritacalx, a smoother shell and much larger buttresses.

Aspella media differs in having a smoother shell with less apparent, almost indistinguishable spiral cords, less impressed suture, a broader aperture, a shorter siphonal canal, and also buttresses twice as broad.

All other Indo-West Pacific species also differ by having a different intritacalx and/or protoconch, and in having twice as broad buttresses. They do not need further comparison here.

Etymology. Named after Hélène Boutet, whose patience and sharp vision was of great help in collecting a number of small species, and who thus contributed to a better knowledge of the malacological fauna of French Polynesia.

Aspella hildrunae n. sp.
Figs 3, 7, 12, 20-21, 41-43

Aspella platylaevis – Tröndlé & Houart, 1992: 80, figs 28, 109: Houart, 1994: 78, fig. 88 (not *Aspella platylaevis* Radwin & D'Attilio, 1976).

Type material. French Polynesia, Society Archipelago, Tahiti, Punaauia, Amiral Reef, coral fragments, holotype MNHN 20165; 1 paratype ANSP 416361; 1 paratype BMNH 20070516; 1 paratype NM L7371/T2244; 1 paratype SMNH Type collection

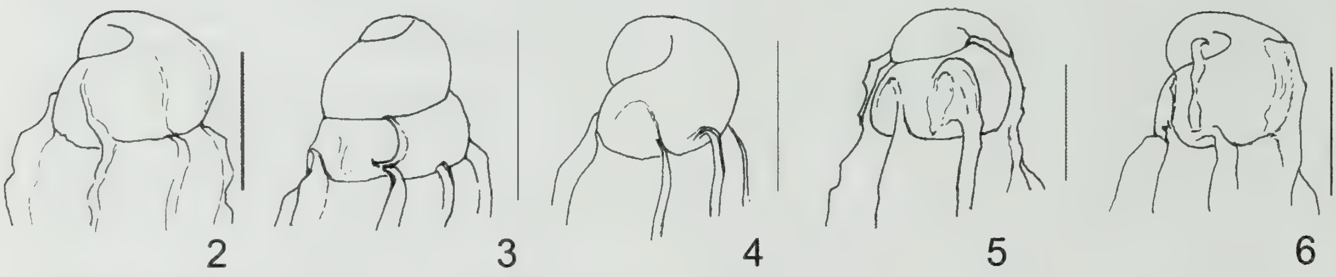
7339; 1 paratype USNM 1107848; 9 paratypes JT (lv. & dd); Pirae, under coral, shallow water, 1 paratype AMS C.211917; 1 paratype IRSNB I.G. 30.869; 1 paratype NMNZ M.274463; 7 paratypes RH (lv. & dd).

Other material examined. French Polynesia, Marquesas Islands, Nuku Hiva, 2 lv., MB.
Society Archipelago, Raiatea, 1 dd, MB; Huahine, Tefarerii lagoon, under coral fragments, 0.6 m, 3 lv., MB; reef, under stones, 1 lv., JT; lagoon, under stones, 19/7/75, 4 lv., JT; Tahiti, under coral blocks, 2 lv., RH; Hitiaa, 2 lv., RH; Hitiaa and Tiarei, 3 lv., RH; Papara, reef, 8 lv. & dd, JT; Papara, Marae reef, 2 lv. & 1 dd, JT; Papara, reef, 1 lv. , JT; Mahaiatea, Marae reef, 4 m, 14/7/81, 4 lv. , JT; Papara lagoon, on reef flat, 11 lv. & dd, MB; Faaone, reef, 2 lv., 1 dd, JT; Papeete, reef, 1 lv. & 1 dd , JT; Mahina, reef, 2 lv. , JT; Mahina, Pointe Venus reef, 2 lv. , JT; Punaauia, 20-30 m, 4 lv. & dd, MB; Pueu lagoon, under dead coral, 2 dd, MB; Moorea Is., Barrier reef between Cook's and Opunohu Bays (Vaipahu), outer part of barrier reef, 0-2 m, 1 lv., FMNH UF401131; Moorea Is., narrow reef flat around Pt. Faupo, narrow oceanic reef flat, under rock in 10-20 cm, 1 lv., FMNH UF400488; Moorea Is., Fore reef ca. 1 km W of Avaroa Pass, outer reef slope, under rocks, 5-10 m, 1 lv., FMNH UF400884.
Tuamotu Archipelago, Anaa, high tide line, 1 lv., JT.
Gambier, Mangareva, high tide line, 1985, 1 dd., JT.

Type locality. French Polynesia, Society Archipelago, Tahiti, Punaauia, Amiral Reef, coral fragments.

Distribution. Society Archipelago, Tuamotus and Gambier, living at 0-4 m, on and under stones and dead coral.

Description. Shell large for the genus, up to 19.88 mm in length at maturity (paratype JT), slender, lanceolate, flat. Shoulder weakly or strongly concave. Length/width ratio 2.09-2.58. Light cream, covered by white, cream or light tan, axially and spirally striate intritacalx (Figs 20-21). Aperture cream or glossy white.
Spire very high, acute with 2-2.15 protoconch whorls (Fig. 3) and up to 8 or 9 narrow, flattened, shouldered teleoconch whorls. Suture strongly impressed, partially obscured by broad buttress connecting to preceding whorl. Protoconch small, narrow, conical. Terminal lip thin, erect, of sinusigera type.
Axial sculpture consisting of low and high, narrow varices. First two whorls with 6 high varices, reduced to four high varices and two low ones with buttresses connecting to preceding whorl on third and fourth whorls, and to 2 high, 2 low and 2 reduced broad buttresses connecting to preceding whorl from fifth to last whorl. Two lateral varices on third or fourth to last whorl flat and high, giving a flattened and lanceolate appearance to the shell. Last whorl with first and fourth varices reduced to broad, flat buttresses connecting to preceding whorl; second and fifth varices low adapically, moderately high abapically, connected to preceding varix with narrow buttress; third and sixth varices high, flattened, narrow. Spiral sculpture indistinct on spire whorls. Last whorl with almost indistinguishable, broad, flat, primary cords: P1-P6. P4 highest, often only distinct cord, extending as broad, short node abapically on second and fifth varices, followed by occasionally distinct, narrow P5 and flat P6. ADP and MP occasionally distinct on second and fifth varices, not between them.
Aperture small, ovate; columellar lip narrow, smooth, rim adherent. Anal notch shallow, very broad. Outer lip weakly erect with 6-8 weak, narrow denticles within: D1-D6. D3 and D6 occasionally split. Siphonal canal short, narrow, weakly dorsally bent at tip, narrowly open.
Operculum (Fig. 7) strongly ovate with apical nucleus. Radula (Fig. 12) with rachidian bearing a broad, triangular, central cusp and on each side, a narrow, long, lateral denticle and a broad, long, lateral cusp. Lateral denticles and lateral cusps of similar length, approximately half the length of central cusp. Lateral teeth sickle-shaped, narrow.



Figures 2-6. Protoconchs (scale bars 0.5 mm)

2. *Aspella helenae* n. sp; **3.** *A. hildrunae* n. sp.; **4.** *A. platylaevis* Radwin & D'Attilio, 1976; **5.** *A. lozoueti* n. sp.; **6.** *A. media* Houart, 1987

Remarks. *Aspella hildrunae* n.sp. was confused with *A. platylaevis* (Figs 44-45) by Tröndlé & Houart (1992: 80) due to its similar size and outline, however *A. hildrunae* differs by its more reticulated, less dense, and more roughly sculptured intritacalx (Figs 20-21 *vs.* 30-31) and by its different protoconch morphology, being rounded and consisting of 1.5 globose rounded whorls in *A. platylaevis*, while conical, consisting of 2-2.15 whorls in *A. hildrunae*. *A. hildrunae* also has a relatively slightly wider aperture.

Aspella hildrunae differs from *A. media*, a similarly shaped *Aspella* species, described from New Caledonia and also living in the Philippines and in Guam (coll. RH), in having a less densely reticulated intritacalx (Figs 20-21 *vs.* 28-29), strongly concave shoulder, and a conical protoconch of 2-2.15 whorls *vs.* rounded, of 1.5 whorls in *A. media*.

Aspella hildrunae differs definitively in many ways from the other species occurring in French Polynesia: *A. producta*, *A. helenae* and *A. lozoueti* n.sp., as well as from any other Indo-West Pacific species, which do not need to be compared further here (see also Table 1).

Etymology. Named after Hildrun Tröndlé, wife of the co-author, who collected several samples of the new species, in recognition for her extreme patience for about thirty years of his research.

Aspella lozoueti n. sp.

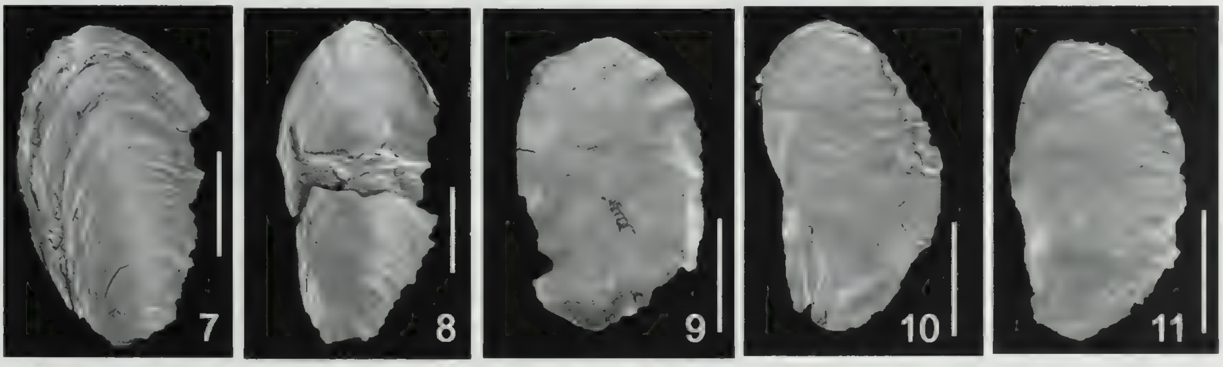
Figs 5, 8, 13, 22-25, 37-40

Type Material. Atelier RAPA, French Polynesia, Austral Archipelago, Rapa, north of Rapa Iti Is., stn 11, 27°37.2' S, 144°18.2' W, patch of sand on hard substrate and dead coral, 2 m, holotype MNHN 20161.

Paratypes: SW of Pointe Gotenaonao, stn 27, 27°38.7' S, 144°19.2' W, 6 m, 1 lv., 1 dd, RH; Cave, SE of Pointe Tematapu, stn 34, 27°34.8' S, 144°19.0' W, 2-8 m, 8 lv., MNHN 20162 ; N of Baie de Anatakuri, stn 38, 27°37.4' S, 144°18.4' W, 2 m, 8 lv. & dd, MNHN 20163.; Baie Akatanui, stn 81, 27.35.9' S, 144°18.5' W, on rocks, 1 lv., MNHN 20164 (Fig. 40).

Other material examined. Atelier RAPA, French Polynesia, Austral Archipelago, Rapa, Rarapai Is., stn 4, 27°34.3' S, 144°22.1' W, 18 m, 2 dd; SE of Tauna Is., stn 8, 27°36.5' S, 144°17.7' W, 52-57 m, 5 lv.; Baie de Hiri, stn 9, 27°37.3' S, 144°22.2' W, 3-24 m, 1 lv.; S of Baie de Anatakuri, stn 19, 27°37.7' S, 144°18.7' W, 3 m, 1 dd; Vavai, stn 20, 27°35.4' S, 144°23.3' W, 5 m, 2 dd; E of Baie Tupuaki, stn 21, 27°34.2' S, 144°20.6' W, 5 m, 2 lv. & dd; off Cap Rukuaga, stn 22, 27°33.9' S, 144°21.7' W, 18-22 m, 1 lv.; Vavai, stn 32, 27°35.0'/35.8' S, 144°22.7'/23.0' W, 15-20 m, 1 dd; Baie de Haurei, stn 43, 27°36.8' S, 144°18.3' W, 45 m, 2 dd; NW of Tauna Is., stn 44, 27°36.3' S, 144°18.2' W, 30 m, 11 lv & dd; Baie de Haurei, stn 47, 27°36.7' S, 144°19.1' W, 33 m, 1 dd; off Pointe Rukuaga, stn 48, 27°34.1' S, 144°22.1' W, 36 m, 2 lv.; Baie Pake, stn 60, 27°37.2' S, 144°18.8' W, 1-1.5 m, 1 dd; Baie Pake, stn 61, 27°37.0' S, 144°18.6' W, 10-15 m, 1 lv.; Pointe Maomao, stn 78, 27°36.6' S, 144°18.9' W, tide, 1 lv.; Baie Pake, stn 82, 27°37.1' S, 144°18.5' W, 1 lv; Baie Tupuaki, stn 93, 27°34.6' S, 144°20.6' W, tide, 2 dd; Pointe Komire, stn 98, 27°34.8' S, 144°22.8' W, 16-18 m, 5 lv. & dd (all MNHN).

Rapa, sediments, 35 m, 28/11/2002, 4 dd (JT).



Figures 7-11. Opercula. SEM A. Warén

7. *Aspella hildrunae* n.sp. (scale bar: 1 mm); **8.** *Aspella lozoueti* n.sp. (scale bar: 500 µm); **9.** *Orania ataea* n.sp. (scale bar: 1.2 mm); **10.** *Pascula ozenneana* (Crosse, 1861) (scale bar: 1.2 mm); **11.** *Usilla avenacea* (Lesson, 1842) (scale bar 1.5 mm)

Type locality. French Polynesia, Austral Archipelago, Rapa, north of Rapa Iti Is., stn 11, 27°37.2' S, 144°18.2' W, patch of sand on hard substrate and dead coral, 2 m.

Distribution. French Polynesia, Austral Archipelago, Rapa, living at 0-52 m.

Description. Shell small for the genus, up to 8.2-8.5 mm in length at maturity, slender, lanceolate, flat, weakly nodose. Shoulder slightly convex. Length/width ratio 2.06-2.32. White, covered by white, cream, or light tan, cancellate intritacalx (Figs 22-23). Aperture glossy white.

Spire very high, acute, with 1.5 protoconch whorls (Fig. 5) and teleoconch whorls up to 6 broad, very weakly shouldered whorls. Suture impressed, obscured by broad buttress connecting preceding whorl. Protoconch large, broad, whorls rounded, with minute rounded, pustules, more numerous and broader on last whorl and near terminal lip (Fig. 25), entirely covered by axial lamellae of first teleoconch whorl (Fig. 24); terminal lip weakly raised, gently convex.

Axial sculpture of teleoconch whorls consisting of high, narrow varices. First two whorls with 6 varices, reduced to four varices and two buttresses from third to last whorl. Ventral and dorsal varices reduced in strength abapically. Two lateral varices flat and high, giving a flattened and lanceolate appearance to the shell. Last whorl with first and fourth varices reduced to broad, flat buttresses connecting to preceding whorl; second and fifth varices low adapically, moderately high abapically, connected to preceding varix with narrow buttress; third and sixth varices high, narrow. Spiral sculpture of 6 low, occasionally nodose cords, more apparent under low-angled light (Fig. 39). Last whorl with low P1; P2 and P3 higher, of same strength and height, P4 broader and higher, P5 and P6 low, almost indistinct. Spiral cords not very distinct or absent on previous spire whorls. Other sculpture consisting of a minutely cancellate intritacalx (Figs 22-23).

Aperture small, roundly ovate; columellar lip narrow, smooth, rim adherent. Anal notch shallow, broad. Outer lip weakly erect, smooth, with 5-7 weak elongate denticles within: (ID), D1-D5. D1 occasionally split. Siphonal canal short, narrow, strongly bent dorsally, broadly open.

Operculum (Fig. 8) strongly ovate with apical nucleus.

Radula (Fig. 13) with rachidian bearing a broad, triangular, central cusp and on each side, a narrow, long, lateral denticle and a broad, long, lateral cusp. Lateral denticles and lateral cusps of similar length, approximately half the length of central cusp. Lateral teeth sickle-shaped, narrow.

Remarks. *Aspella lozoueti* n.sp. resembles *A. media* Houart, 1987, described from New Caledonia and currently also known from the Philippines and Guam (coll. RH). *A. lozoueti* differs from *A. media* in having a comparatively smaller shell with a broader protoconch and a wider aperture, a less flattened shell, and apparent pustulose sculpture and spiral cords, whereas *A. media* is smooth or with very low, almost indistinct, broad and flat spiral cords of same strength. *A. lozoueti* also has a cancellate intritacalx as in *A. media* (Figs 28-29), however being more conspicuous in *A. lozoueti*. *A. media* has not yet been recorded from French Polynesia.

Aspella lozoueti may be compared also with *Aspella platylaevis* Radwin & D'Attilio, 1976 (Figs 44-45). It differs from that species by its smaller, narrower and more strongly apparent spiral cords and more nodose shell, by its more denticulate aperture, its less concave shoulder, and mainly, by its different intritacalx (Figs 30-31) which is more cancellate in *A. lozoueti*. *A. platylaevis* has not yet been recorded from French Polynesia; previous records of that species turned out to be *A. hildrunae* n.sp.

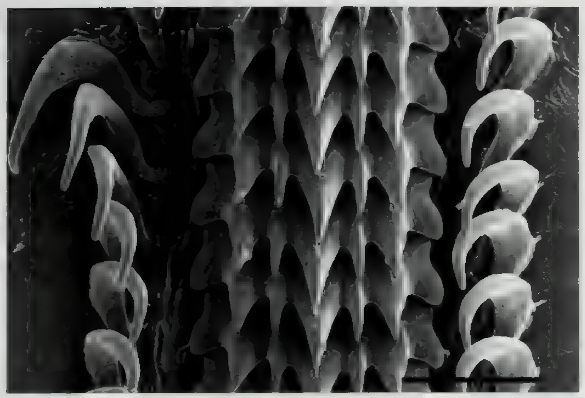
Aspella lozoueti differs from *A. producta* (Pease, 1868), a species recorded in French Polynesia, in many ways: less cancellate intritacalx (Fig. 27), flatter shell, comparatively broader aperture and broad protoconch of 1.5 whorls *vs.* conical with 2.5 - 2.75 whorls in *A. producta*.

Aspella lozoueti differs greatly from other *Aspella* species from the Indo-Pacific; as a reminder: *A. acuticostata* (Turton, 1932), *A. hastula* (Reeve, 1844), *A. mauritiana* Radwin & D'Attilio, 1976, *A. media* Houart, 1987, *A. platylaevis* Radwin & D'Attilio, 1976, *A. ponderi* Radwin & D'Attilio, 1976, *A. producta* (Pease, 1861), *A. schroederi* Houart, 1996, *A. thomassini* Houart, 1985 and *A. vokesiana* Houart, 1983. Those need no further comparison here (see also Table 1).

Etymology. The species is named after Pierre Lozouet, MNHN researcher and participant in the "Atelier Rapa 2002"where the species was recorded.

Figures 12-19. Radulae (scale bars: 12 & 13: 25 µm; 14, 15, 17, 18, 19: 60 µm; 16: 100 µm). SEM A. Warén

12. *Aspella hildrunae* n.sp.; **13.** *Aspella lozoueti* n.sp.; **14.** *Cytharomorula springsteeni* Houart, 1995; **15.** *Orania atea* n.sp.; **16.** *Pagodula atanua* n.sp.; **17.** *Usilla avenacea* (Lesson, 1842); **18-19.** *Pascula ozenneana* (Crosse, 1861).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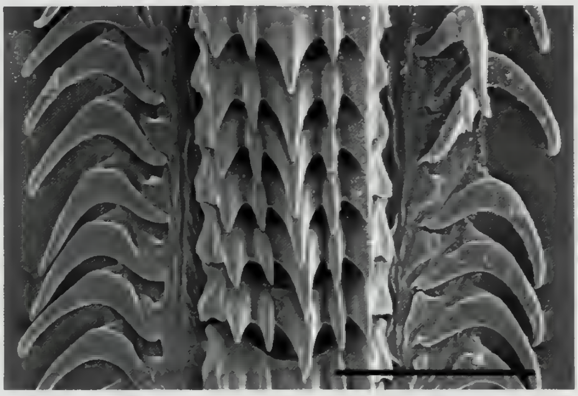
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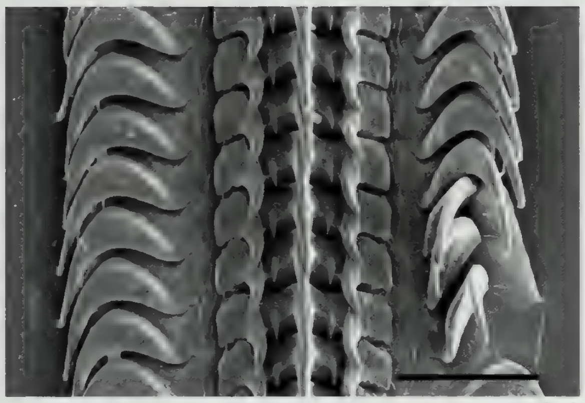
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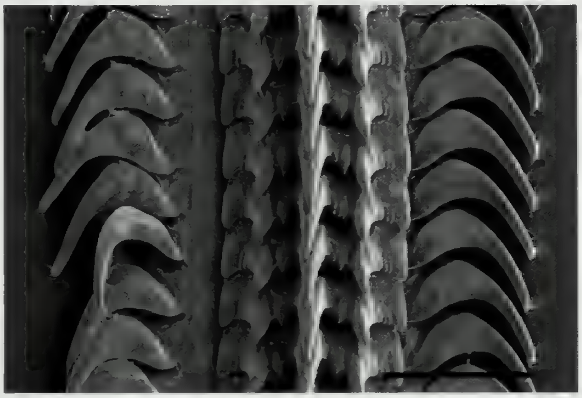
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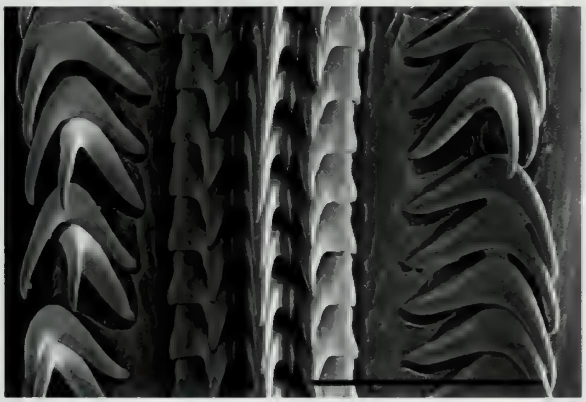
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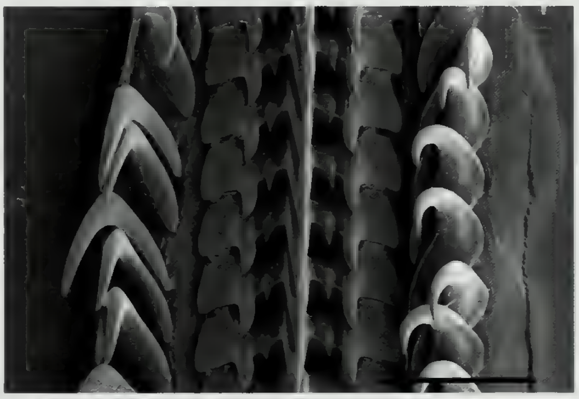
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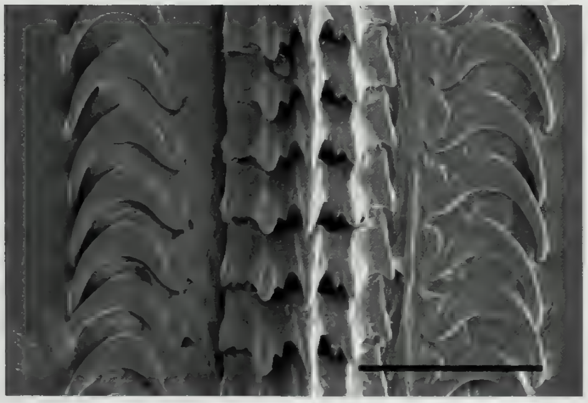
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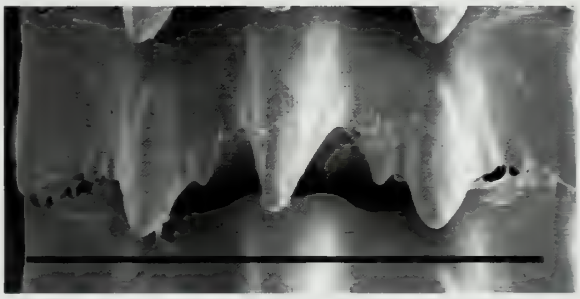
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	A. helenae	*A. hildrunae*	*A. lozoueti*	*A. platylaevis*	*A. media*	*A. producta*
Protoconch	Large, broad, with 1.5 whorls. Terminal lip thin, raised, slightly curved (Fig. 2)	Small, narrow, conical, with 2-2.15 whorls. Terminal lip thin, erect, of sinusigera type (Fig. 3)	Large, broad, with minute, rounded pustules, with 1.5 whorls. Terminal lip weakly curved, gently convex (Figs 5, 24-25)	Small, rounded, with 1.5 whorls. Terminal lip thin, weakly curved (Fig. 4)	Small, rounded, with 1.5 whorls. Terminal lip raised, thin, strongly curved abapically (Fig. 6)	Small, conical, with 2.5-2.75 whorls. Terminal lip erect, of sinusigera type
Spiral cords on last teleoconch whorl	Broad, low, occasionally slightly nodose. P1-P3 most obvious, P4 very low, P5-P6 almost indistinguishable	Almost indistinguishable, broad, flat cords. P4 highest, often only distinct cord.; occasionally with distinct, narrow P5 and P6	Low, occasionally nodose cords. P2 and P3 higher, of same strength, P4 broader and higher, P5 and P6 low, almost indistinct	Low, almost indistinguishable cords. Occasionally with more apparent P2, P3 and P4. P4 most apparent	Indistinguishable or almost indistinct, low, broad, flat cords of same strength	P1, P2, P3 low, P4 high, more apparent on varices, P5 and P6 low. Pustolose
Intritacalx	Cancellate (Fig. 26)	Axially and spirally striate (Figs 20-21)	Minutely cancellate (Figs 22-23)	Axially striate with faint axial striae (Figs 30-31)	Axially and spirally striate (Figs 28-29)	Strongly cancellate (Fig. 27)
Buttresses	Narrow	Broad	Broad	Broad	Broad	Broad

Table. 1. Details of shell morphology in some *Aspella* species.

Dermomurex (Takia) infrons Vokes, 1974
Figs 49-50

Murex inermis Sowerby, 1841: pl. 192, fig. 87 (non Philippi, 1836).
Dermomurex (Takia) infrons Vokes, 1974: 2 (n.n. pro *inermis* Sowerby, 1841, non Philippi).

Material examined. BENTHAUS, Austral Archipelago, stn CAS 2008, 22°27.06' S, 151°18.88' W, 280-300 m, 1 dd, MNHN.

Distribution. South Africa, Transkei (NM), Indonesia, Tanimbar Is. (MNHN), Taiwan (MNHN), Japan (NSMT) and Austral Archipelago (MNHN).

Remarks. *Dermomurex infrons* was originally described from Japan by Sowerby (1841) as *Murex inermis,* an unavailable name because it had already been used by Philippi a few years before. Recent expeditions extended the geographical range of that species throughout the Indo-West Pacific.

Subfamily Muricopsinae Radwin & D'Attilio, 1971

Remarks. Five species were recognized in Tröndlé & Houart (1992). Ten additional species are now included, of which three are described as new, *Favartia (Favartia) salvati* n.sp. from the Marquesas and the Austral Islands, and *F. (F.) nivea* and *F. (Pygmaepterys) avatea* from the Austral Islands. They were collected during BENTHAUS and MUSORSTOM 9 expeditions. The other species are identified as new records. Some additional species remain unidentified and/or undescribed because of insufficient of material. The number of muricopsine species is thus increased from 5 to 15 (see Table 4).

Favartia (Favartia) conleyi Houart, 1999
Figs 51-55

Favartia conleyi Houart, 1999: 14, figs 1, 4-5.
Favartia (Murexiella) lillouxi Myers & Hertz, 1999: 182, figs 1-4.

Material examined. MUSORSTOM 9, Marquesas, stn CP1159, 7°58.3' S, 140°43.7' W, 145 m, 1lv.; stn DR1257, 9°25.8' S, 140°08.2' W, 85-127 m, 2 dd, MNHN; Society Archipelago, Tahiti, La Faille d'Arue, 56 m, 1 lv, MB.

Type Material examined. *Favartia (Murexiella) lillouxi* Myers & Hertz, 1999, holotype SBMNH 144184 (photographs); *Favartia conleyi* Houart, 1999, holotype MNHN Moll 1023.

Distribution. New Caledonia, Guam and French Polynesia.

Remarks. *Favartia conleyi* was described from Guam, in the Mariana Archipelago. Since then, other specimens have been located in New Caledonia (MNHN) and in French Polynesia. However, the occurrence of *F. conleyi* in French Polynesia was already known since 1999, when *F. lillouxi*, a junior synonym of *F. conleyi*, was described from Tahiti in the Society Archipelago. *F. conleyi* was described in March 1999 while the description of *F. lillouxi* dates to April 1 of the same year.

Favartia (Favartia) guamensis Emerson & D'Attilio, 1979

Favartia guamensis Emerson & D'Attilio, 1979: 4, figs 11, 12.
Favartia crouchi – Tröndlé & Houart, 1992: 83, fig. 33 (not *Murex crouchi* Sowerby, 1894)

Remarks. *Favartia guamensis* was considered a synonym of *F. crouchi* by Tröndlé & Houart (1992: 83); however, since then, we have had the opportunity to examine other specimens of both forms and we are now convinced that they are not conspecific. *F. guamensis* differs consistently from *F. crouchi* in having narrower penultimate and last whorls, a less conical spire, and chiefly, a noticeably different anal sulcus, which is deep, constricted into a narrowly open channel in *F. guamensis vs.* broad and obviously less deep in *F. crouchi*. The different number of varices, 4 in *F. guamensis* and 5 or 6 in *F. crouchi* cited by Shasky (1992), was not observed consistently and cannot be retained as a reliable character. However, Shasky (1992: figs 5-6) illustrated a beautiful specimen of *F. crouchi* from Kwajalein Atoll which confirms the differences observed between the two species.
Emerson & D'Attilio described the protoconch of *F. guamensis* as being low, consisting of 1.5 whorls, however, specimens from Guam and from French Polynesia present a conical protoconch of 3 whorls with a sinusigeral notch, which indicates planktotrophic larval development. That explains the wide geographical distribution in the Indo-West Pacific, from Mozambique to French Polynesia.
It has not yet been possible to examine specimens of *F. crouchi* with intact protoconch.

Favartia (Favartia) maculata (Reeve, 1845)
Fig. 56

Murex maculatus Reeve, 1845: pl. 33, fig. 136; Reeve, 1846: 108.
Murex (Ocinebra) salmonea Melvill & Standen, 1899: 162, pl. 10, fig. 2.
Favartia dorothyae Emerson & D'Attilio, 1979: 5, figs 3,4,15,16.

Material examined. MUSORSTOM 9, Marquesas, stn DW1144, 9°19.3 S, 140°03.8' W, 85-95 m, 1 dd, MNHN; BENTHAUS, stn DW1933, 24°40.72' S, 146°01.31' W, 500-850 m, MNHN, 1 dd.

Distribution. *Favartia maculata* is known from throughout the Indo-West Pacific, occurring from Mozambique to Tonga (Houart & Héros, in press). This is the first time that the species is mentioned from French Polynesia, the current eastern limit in the Pacific Ocean.

Favartia (Favartia) peregrina Olivera, 1980
Fig. 57

Murexiella peregrina Olivera, 1980 : 19, figs 1-3.

Material examined. MUSORSTOM 9, Marquesas, stn DW1242, 10°28.1' S, 138°41.1' W, 119-122 m, 1 lv., MNHN; stn DR1247, 10°34' S, 138°42' W, 1150-1250 m, 1 dd, MNHN.

Distribution. *Favartia peregrina* was described from Bohol Island in the Philippines. It was not recorded from another locality until now, although the multispiral conical protoconch of 2.15-2.30 whorls with sinusigeral notch indicates a planktotrophic larval development. It is thus expected that *F. peregrina* will prove to have a wider geographical range than currently known.

Favartia (Favartia) sp. cf. *F. sykesi* (Preston, 1904)
Figs 58-59

Murex sykesi Preston, 1904: 76, pl. 6, figs 7-8.

Material examined. MUSORSTOM 9, Marquesas, stn DW1203, 9°52.7' S, 139°02.2' W, 60-61 m, 1 dd, MNHN; coll. Von Cosel, Tröndlé & Tardy, Ua Huka, stn 34, 8°56'80"S, 139°35'70"W, 10-15 m, 1dd, MNHN; Nuku Hiva, Taiohae Bay, W Matauapuna, 8°56.22' S, 140°05.68' W, 10-20 m, 1 dd, MNHN; Nuku Hiva, 20-40 m, 2 dd, RH; Nuku Hiva, Taiohae, 40 m, 1 dd, RH; Uea, 30 m, 1 dd, RH.

Distribution. See remarks.

Remarks. *Favartia sykesi* (Preston, 1904) and *F. rosamiae* D'Attilio, & Myers, 1985 are probably not conspecific but certainly closely related to each other. Adults of *F. sykesi* apparently reach a larger size and have 5, or occasionally 6 varices on the last whorl instead of 4, rarely 5, in *F. rosamiae*. They also have slightly wider varices. Both species have a conical protoconch consisting of 3+ whorls with a sinusigeral notch. However, although adults can be easily separated, juveniles of both species are almost impossible to differentiate. *Favartia (Favartia)* sp. cf. *F. sykesi* from the Marquesas Archipelago also has a multispiral protoconch and seems to be a somewhat intermediate form between *F. sykesi* and *F. rosamiae*. The shell is smaller than *F. sykesi* reaching the same length as *F. rosamiae*, but bearing 5 varices on the last whorl as in *F. sykesi* while having narrower varices, like *F. rosamiae*.
To complicate things, one specimen of a typical *Favartia rosamiae* with 4 varices on the last whorl is included in a lot of 3 shells from Marquesas that was cited by Houart & Tröndlé (1997: 3) (Fig. 60).

Favartia sykesi was described from Sri Lanka and is currently known from a few scattered localities: Sri Lanka, Java, Thailand and Phuket (all RH).
Favartia rosamiae was described from the Philippines. Other specimens have been collected in Japan (Tsuchiya, 2000: 377), Papua New Guinea, Moluccas (RH) and New Caledonia (MNHN).
Examination of additional material from localities between the Philippines, Papua New Guinea and French Polynesia is necessary to reach a conclusion. If further studies confirm the French Polynesian form to be conspecific with *F. rosamiae* or *F. sykesi*, it would mean an extension of the geographical range exceeding 8000 km.

Favartia (Favartia) nivea n. sp.

Figs 66-67

Type material. BENTHAUS, French Polynesia, Austral Archipelago, President Thiers Bank, stn DW1937, 24°39.8' S, 145°56.4' W, 469-500 m, 1 dd, holotype MNHN 20171.

Type locality. French Polynesia, Austral Archipelago, President Thiers Bank, stn DW1937, 24°39.8' S, 145°56.4' W, 469-500 m.

Distribution. Austral Archipelago, President Thiers Bank, depth of living specimens unknown.

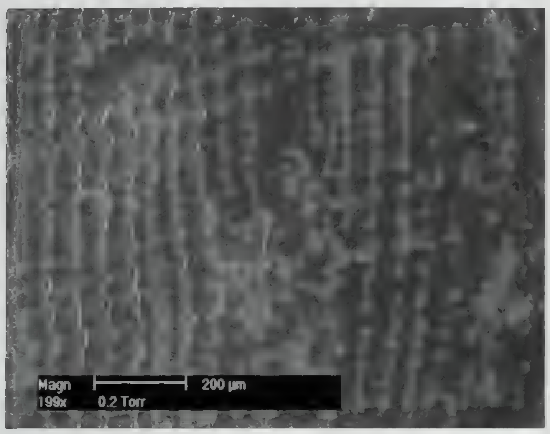
Description. Shell small for the genus, 11.35 x 6.26 mm at maturity, length/width ratio 1.80, broadly lanceolate, heavy, weakly squamous. Shoulder sloping, weakly concave. White with only small brown blotches near varices and dorsally on siphonal canal; aperture white.
Spire high with 1.5 protoconch whorls and 5 shouldered, weakly spinose whorls. Spire whorls narrow, last whorl broad with expanded apertural varix. Suture weakly adpressed. Protoconch large, whorls rounded; terminal lip eroded.
Axial sculpture of teleoconch whorls consisting of high, broad varices, each with short, broad, blunt spines: first teleoconch whorl with 8 varices, second with 7, third with 6; fourth and last whorl with 4, apertural varix webbed. Spiral sculpture of high, strong, broad, squamous, primary cords grooved with 1 or 2 narrow spiral striae. Spiral sculpture of first whorl eroded, second and third with P1 and P2, fourth with P1-P3, last whorl with IP, P1-P6. Spiral cords of last whorl visible only on varices. IP flat, broad, probably split. P1-P5 approximately of same strength, strong, high, broad, with deep pits between each pair of cords, P6 small, narrow, low. Intervarical area smooth or with only weakly apparent cords. Cords extending on varix, forming broad, blunt, open spines.
Aperture small, ovate; columellar lip broad, slightly flaring, smooth, completely erect with small notch abapically. Anal notch shallow, broad. Outer lip weakly erect, crenulate, with 7 strong elongate denticles within: ID split, D1-D5. Adapical denticles low, increasing in strength abapically, D4 and D5 strongest. Siphonal canal short, broad, slightly recurved dorsally, narrowly open, with 2 cords, ADP and MP extending as short, blunt, open spines, MP spine shorter.
Operculum and radula unknown.

Remarks. *Favartia nivea* n.sp. differs from other *Favartia* species with lecithotrophic larval development such as *F. ponderi* Myers & D'Attilio, 1989 known from scattered localities in the Pacific, *F. peasei* (Tryon, 1880) from the Indo-West Pacific, *F. morisakii* Kuroda & Habe, 1961 from Japan, *F. phantom* (Woolacott, 1957) from west Australia, and *F. voorwindei* Ponder, 1972 from Queensland, Australia, in having almost smooth intervarical areas, fewer axial varices on the last teleoconch whorl, a narrow, high, webbed apertural varix, narrower spire whorls, and a comparatively narrower aperture.
Favartia salvati n.sp. is sympatric with *F. nivea* n.sp. at station 1937, however *F. nivea* differs in many aspects of shell morphology: comparatively smaller, narrower spire, smoother spiral cords, decreasing in strength abapically, almost smooth intervarical areas, narrower aperture and shorter siphonal canal. The protoconch is also different, large, rounded, consisting of 1.5 whorls in *F. nivea vs.* small, conical, consisting of 2+ whorls in *F. salvati*.

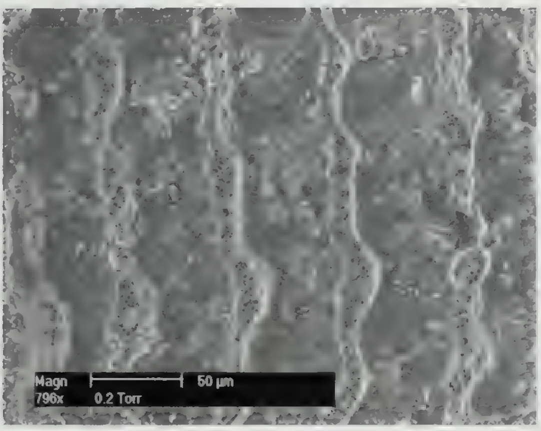
Etymology. *Nivea* (L): white.

Figures 20-27. Details of shell microsculpture
20-21 & 27: uncoated SEM J. Cillis; 22-25: gold coated. SEM A. Warén

20-21. *Aspella hildrunae* n.sp. (intritacalx); **22-25.** *Aspella lozoueti* n.sp. (**22-23.** intritacalx; **24-25.** Protoconch); **26.** *Aspella helenae* n.sp. (intritacalx); **27.** *Aspella producata* (Pease, 1861) (intritacalx).


Magn
199x
200 µm
0.2 Torr

20


Magn
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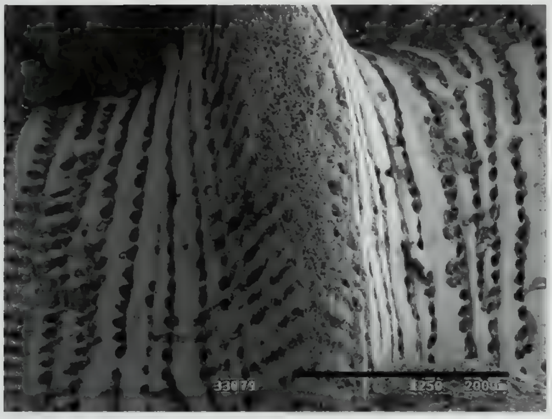
21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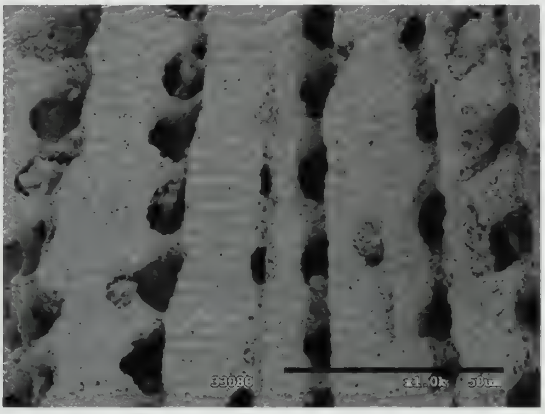
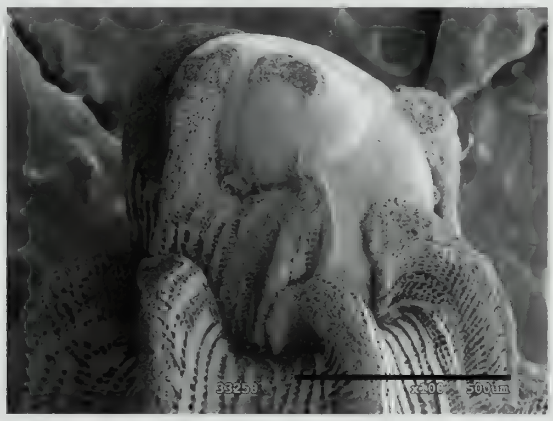
x250
200µm

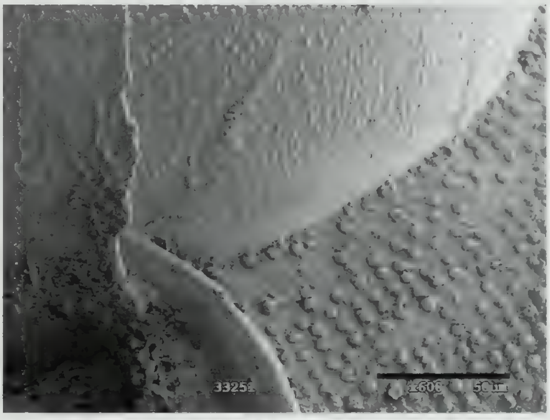
22


33080
x1.0k
50µm

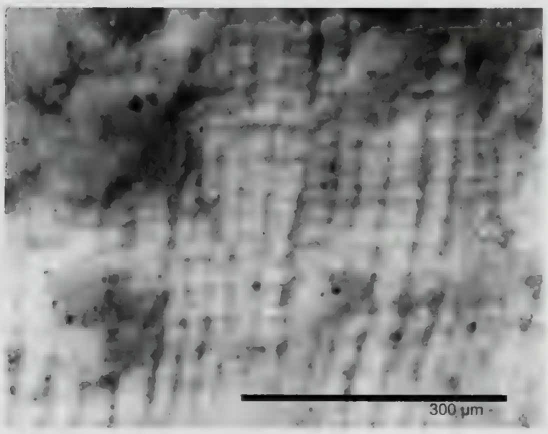
23


33258
x100
500µm

24


33251
x600
50µm

25



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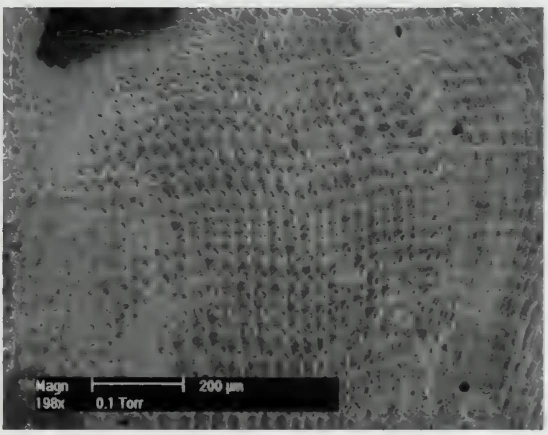

Magn
198x
200 µm
0.1 Torr

27

(Favartia) salvati n. sp.

Figs 61-65

Type material. BENTHAUS, French Polynesia, Austral Archipelago, Tubuai Island, stn DW1959, 23°19.8' S, 149°30.4' W, 95-380 m, 2 lv., holotype MNHN 20167, and 1 paratype RH; President Thiers Bank, stn DW1937, 24°39.8' S, 145°56.4' W, 469-500 m,, 1 dd, paratype MNHN 20169; stn DW1958, 23°19.6' S, 149°30.3' W, 80-150 m, 1 dd, paratype MNHN 20168; Rimatara, stn DW2013, 22°38.6' S, 152°49.7' W, 80-93 m, 1 lv, paratype MNHN 20170.

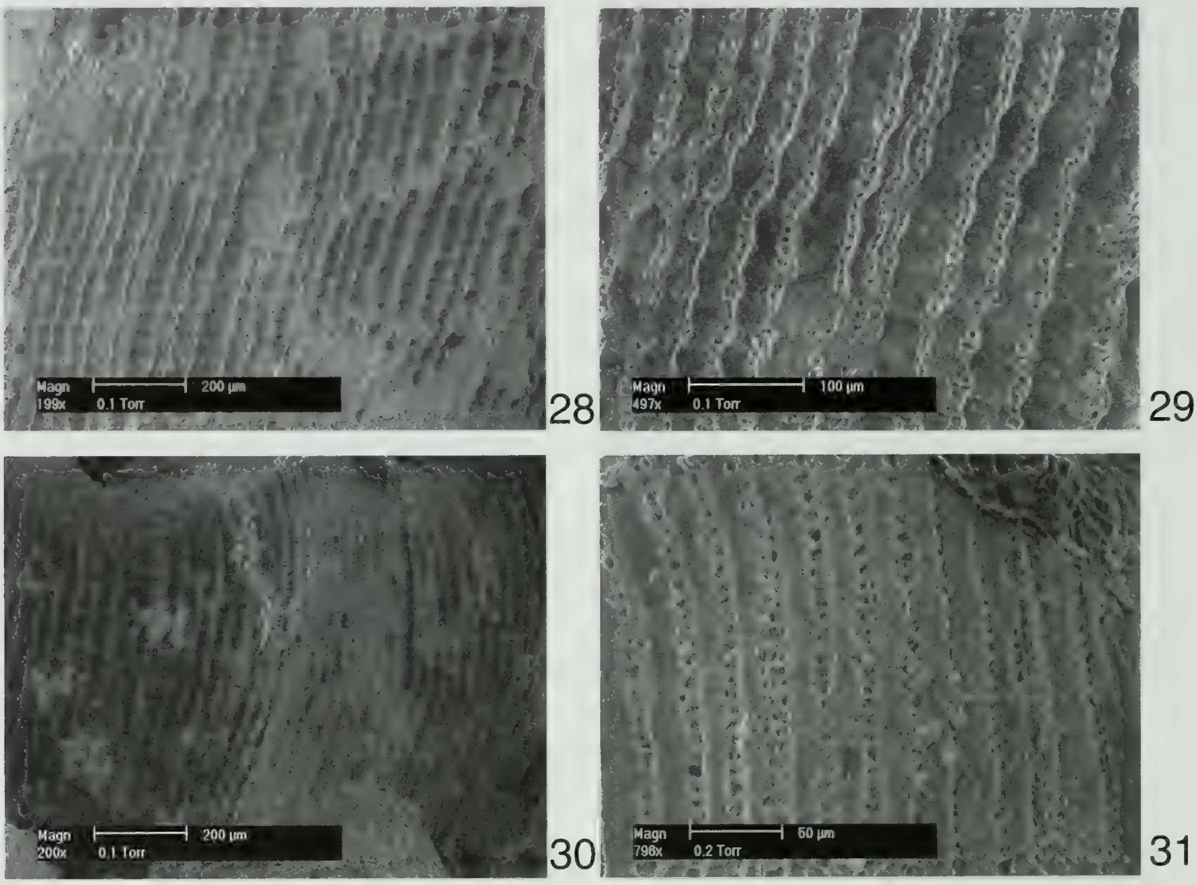
Other material examined. MUSORSTOM 9, Marquesas, Motu One, stn DW1281, 7°48' S, 140° 21' W, 450-455 m, 1 dd,

Type locality. French Polynesia, Austral Archipelago, Tubuai Island, stn DW1959, 23°19.8' S, 149°30.4' W, 95-380 m.

Distribution. French Polynesia, Marquesas and Tubuai Islands, living at 80-95 m.

Description. Shell medium sized for the genus, up to 20.9 mm in length at maturity, length/width ratio 1.47-1.80, broadly ovate, heavy, squamous. Shoulder weakly sloping, convex. Light cream with light brown band on shoulder, near suture and between P5 and ADP, occasionally extending on siphonal canal. Aperture white.

Spire high with 2+ protoconch whorls (partly broken) and teleoconch up to 5 or 6 broad, convex, shouldered, nodose whorls. Suture impressed, obscured by small lamellae of following whorl. Protoconch small, conical, whorls convex; terminal lip heavy, broad, of sinusigera type.


Magn 199x 0.1 Torr 200 µm
28
Magn 497x 0.1 Torr 100 µm
29
Magn 200x 0.1 Torr 200 µm
30
Magn 796x 0.2 Torr 50 µm
31

Figures 28-31. Intritacalx (uncoated SEM J. Cillis)

28-29. *Aspella media* Houart, 1987; 30-31. *Aspella platylaevis* Radwin & D'Attilio, 1976

Axial sculpture of teleoconch whorls consisting of high, strong, broad, rounded, squamous varices: first and second teleoconch whorls with 5 or 6 varices, decreasing to 5 on third, 5 or 6 on fourth or fifth, last whorl with 3 or 4 varices. Distance between penultimate and apertural varix on last whorl twice as large as between other varices. Other axial sculpture of broad, squamous lamellae between each pair of varices, more apparent on shoulder, on abapical part of last whorl, and on siphonal canal. Small node near penultimate varix of last whorl, between penultimate and last varix. Spiral sculpture of high, broad, squamous, spirally grooved, primary cords, and squamous threads. Only P1 and P2 visible from first to penultimate whorls. Spiral threads occur from penultimate whorl on. Last whorl with IP, faintly apparent on apertural varix only, P1-P5; P6 reduced or absent. P2 broadest, high, forming strongly shouldered last whorl and with small knob near penultimate varix. P1 slightly narrower, P3-P5 weakly decreasing in strength abapically. Spiral cords between varices obvious from first to penultimate whorl, reduced or absent on last whorl, very obvious on axial varices, forming short, squamous, webbed spines with deep pits in interspaces.

Aperture large, roundly ovate; columellar lip broad, smooth; lip strongly erect, adherent at adapical extremity. Anal notch shallow but wide. Outer lip erect, crenulated, with weak, low denticles within: (ID), P1-P5 split. Siphonal canal long, 45-47 % of shell length, broad, straight, slightly bent abaxially and strongly recurved at tip, ventrally narrowly open. Ornamented with low ADP, MP and ABP, approximately similar in width, extending as short, webbed, squamous spines, decreasing in strength abapically.

Operculum and radula not examined.

Remarks. *Favartia salvati* n.sp. is part of a group of 16 or 17 *Favartia* species with more or less shouldered shell, squamous sculpture, high, webbed varices on the last whorl, expanded apertural varix and more or less long siphonal canal with webbed spines. Some of the species have been included in *Murexiella* (type species: *Murex hidalgoi* Crosse, 1869), mainly due to the webbed structure of the varices (Vokes, 1971, Ponder, 1972, Emerson & D'Attilio, 1979, D'Attilio & Myers, 1985, Houart, 1997 among others). *Favartia salvati* n.sp. differs from many species in that group, by having a conical protoconch with more than two whorls and a sinusigeral notch. It differs from *F. rosamiae* D'Attilio & Myers, 1985, a species with conical protoconch occurring throughout the Indo-West Pacific, by reaching a larger size relative to its number of teleoconch whorls, by having a more shouldered last whorl, a larger gap between P1 and P2, more webbed varices and a longer, straighter siphonal canal with three broad, low, webbed cords instead of two high cords extending as broad open spinelets in *F. rosamiae*.

It differs from *F. sykesi* (Preston, 1904) by the same morphological characters above and by having a large gap between penultimate and apertural varix, and 3 or 4 varices on the last whorl instead of 5, or occasionally 6 in *F. sykesi*.

Favartia salvati differs from *F. confusa*, a species with unknown protoconch morphology, by having more strongly shouldered whorls, with only very faint IP apparent on apertural varix only *vs* obvious adis, IP, abis on shoulder in *F. confusa*, by having a large gap between penultimate and last varix with a small node near penultimate varix, a narrower, higher spire, a relatively wider aperture, a longer siphonal canal, and more expanded varices.

Etymology. At the request of Philippe Bouchet, this new species is named for Bernard Salvat, who started his career as a malacologist and author of "Coquillages de Polynésie", and later became the indefatigable advocate of biodiversity research and marine conservation in French Polynesia.

Favartia (Pygmaepterys) avatea n. sp.

Figs 69-72

Type material. BENTHAUS, French Polynesia, Austral Archipelago, Rimatara, stn 2015, 22°38.16' S, 152°49.55' W, 250-280 m, 1 dd, holotype MNHN 20172; Tubuai, stn DW1958, 23°19.64' S, 149°30.3' W, 80-150 m, 1 dd, paratype MNHN 20173; Rimatara, stn DW2020, 22°36.96' S, 152°49.13' W, 920-930 m, 1 dd, paratype MNHN 20174.

Other material examined. BATHUS 2, New Caledonia, stn DW 749, 22°33' S, 168°26' E, 233-258 m, 1 dd.

Type locality. French Polynesia, Austral Archipelago, Rimatara, stn 2015, 22°38.16' S, 152°49.55' W, 250-280 m.

Distribution. Austral Archipelago, Tubuai and Rimatara, and New Caledonia. Depth of living specimens unknown.

Description. Shell large for the subgenus, up to 11.2 x 6.4 mm at maturity (holotype). Length/width ratio 1.75. Slender, lanceolate, broadly ovate, heavy. Shoulder weakly sloping, weakly concave. Light cream with brown tan above and on siphonal canal. Aperture white.

Spire high with 1.5 protoconch whorls and up to 5 broad, convex, weakly shouldered whorls. Suture impressed, obscured by axial lamellae of following whorls. Protoconch small, whorls rounded; terminal lip unknown (eroded).

Axial sculpture of teleoconch whorls consisting of relatively low, broad, rounded varices. Other axial sculpture of numerous, thin, scabrous lamellae on the whole surface: axial sculpture of first whorl eroded, second with 9 varices, third and fourth with 7 or 8, last whorl with 6. Apertural varix expanded, narrow,

webbed, aperturally densely fimbriate, webbing extending on siphonal canal. Spiral sculpture of high, narrow, nodose, primary cords and numerous squamous threads. First to antepenultimate whorl with visible P1 and P2, penultimate with P1, P2 and P3. Last whorl with P1-P6. P1 to P5 almost similar in strength and equidistant, P6 narrow, half the size of other primary cords, followed by ADP and MP. Other spiral sculpture of 3-5 narrow, squamous threads between each pair of primary cords.
Aperture narrow, ovate; columellar lip narrow with 3 or 4 strong knobs adapically, rim adherent. Anal notch deep, narrow. Outer lip with 5 strong denticles within: ID, D1-D2 fused, D3, D4, D5. D2 strongest, other denticles smaller, of similar size. Siphonal canal short, slightly recurved dorsally, open.
Operculum and radula unknown.

Etymology. Avatea is the goddess of the moon in Polynesian mythology.

Remarks. *Favartia avatea* differs from *F. funafutiensis* by having a stronger spiral sculpture, a less shouldered shell, an aperture with stronger denticles and chiefly a different protoconch consisting of 1.5 whorls denoting non-planktotrophic larval development *vs.* a conical planktotrophic protoconch of 2+ whorls and a terminal lip of sinusigera type in *F. funafutiensis*.
F. avatea differs from *F. menoui* (Houart, 1990) and *F. cracentis* (Houart, 1996), in being broader and larger relative to the number of teleoconch whorls and in having 6 varices on the last whorl *vs.* 3 in *F. menoui* and *F. cracentis*. *Favartia avatea* differs considerably from the other Indo-West Pacific species, which do not need to be compared further here.

Favartia (Pygmaepterys) sp. 1
Fig. 68

Material examined. BENTHAUS, French Polynesia, Austral Archipelago, President Thiers Bank, stn DW1932, 24°40.76' S, 146°01.52' W, 500-800 m; Tubuai, stn DW1957, 23°18.8' S, 149°29.34' W, 558-1000 m, 1 dd; Tubuai, stn DW1959, 23°19.77' S, 149°30.44' W, 95-380 m, 1 dd; Tubuai, stn DW1961, 23°20.9' S, 149°33.5' W, 470-800 m, 1 dd.

Remarks. Compared with *F. avatea* n.sp., this species has a more angulate shell with fewer axial varices (5 *vs.* 6 on last whorl and 6 *vs.* 7 or 8 on the other whorls) fewer axial scabrous lamellae on the whole surface, a weakly broader aperture, a broader anal notch, and a slightly different spiral sculpture with the presence of IP on penultimate and last whorls. It could be a form of the previous species, although the differences seem to be constant. Until more material is available, we will consider it here as a different species but will not name it.

Favartia (Pygmaepterys) sp. 2
Figs 73-74

Material examined. BENTHAUS, French Polynesia, Austral Archipelago, Rimatara, stn DW2020, 22°36.96' S, 152°49.13' W, 920-930 m, 1 dd, MNHN.

Remarks. The species is sympatric with *F. (P.) avatea* n.sp., however, it differs in having more apparent, narrower axial varices, a roundly ovate aperture with a shallower anal notch, more conspicuous spiral primary cords and chiefly, a last teleoconch whorl with only 3 axial varices. Upon first

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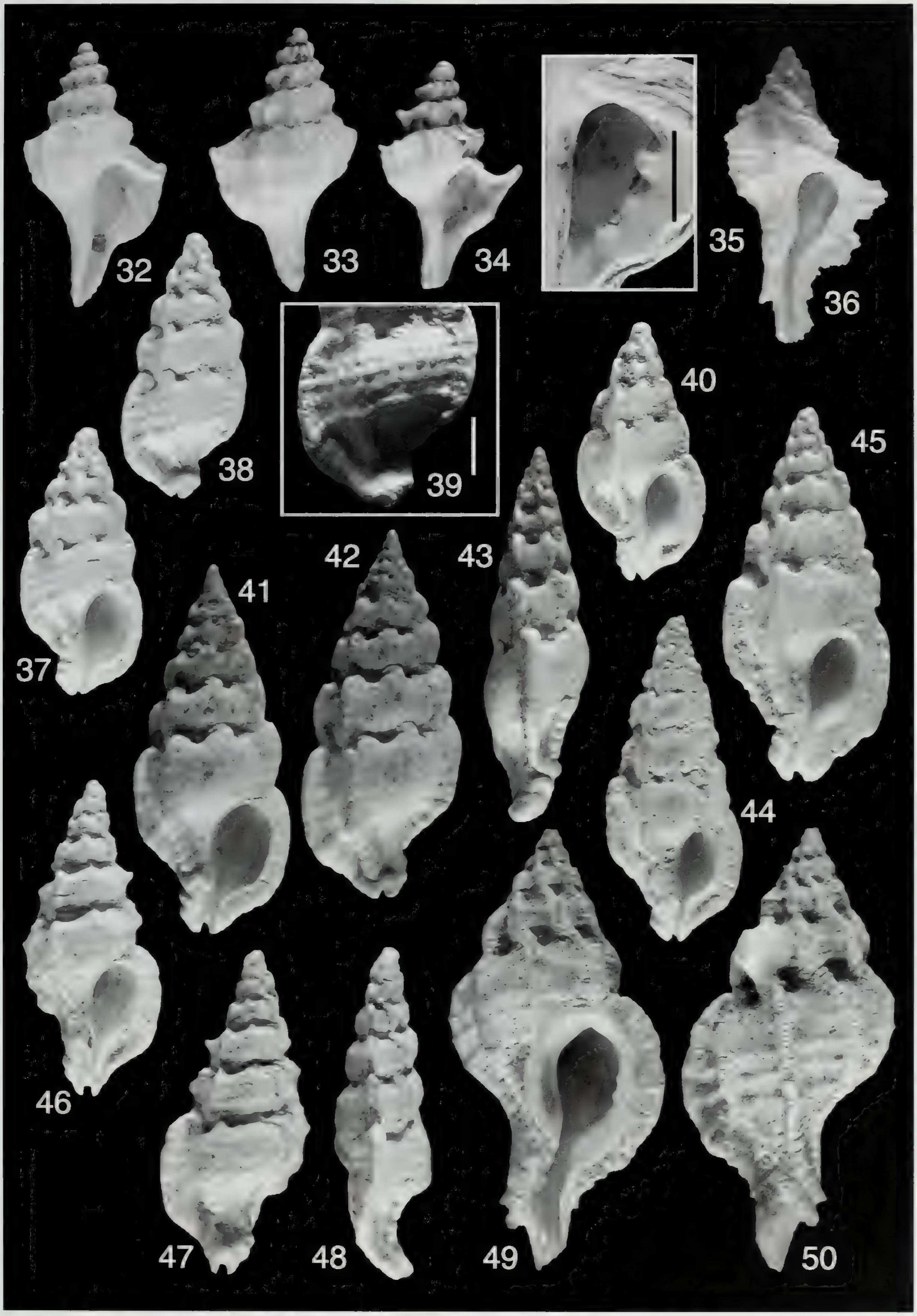
Figures 32-50

32-35. *Poirieria (Paziella) tanaoa* Houart & Tröndlé n.sp.
32-33. Holotype MNHN 20159, 8.2 mm; **34.** Paratype MNHN 20160, 5.4 mm; **35.** Detail of the aperture, paratype MNHN (scale bar: 1.5 mm).
36. *Pterymarchia aparrii* (D'Attilio & Bertsch, 1980). BENTHAUS, Austral Archipelago, stn DW1914, 27°03.52' S, 146°04.01' W, 150 m, MNHN, 21.6 mm.
37-40. *Aspella lozoueti* Houart & Tröndlé n.sp.
37-39. Holotype MNHN 20161, 8.2 mm (scale bar: 1 mm). **40.** Paratype MNHN 20164, 8 mm.
41-43. *Aspella hildrunae* Houart & Tröndlé n.sp. Holotype MNHN 20165, 15.1 mm.
44-45. *Aspella platylaevis* Radwin & D'Attilio, 1976.
44. Holotype ANSP 285147, Woodman Pt, Cockburn Sound, West Australia, ca. 37.75 S, 114.40 E, 11.8 mm.
45. Paratype ANSP 201642, S.W. Rattakadokorn Id, Palau Ids, 7.30' N, 134.30' E, Western Carolines, 14.11 mm.
46-48. *Aspella helenae* Houart & Tröndlé n.sp. Holotype MNHN 20166, 8.8 mm.
49-50. *Dermomurex (Takia) infrons* Vokes, 1974. BENTHAUS, Austral Archipelago, stn CA 2008, 22°27.06' S, 151°18.88' W, 280-300 m, 23.1 mm.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inspection, it differs from the three other three-varical *Pygmaepterys* species, namely *F. (P.) dondani* (Kosuge, 1984), *F. (P.) menoui* Houart, 1990 and *F. (P.) cracentis* Houart, 1996, but the single specimen collected is damaged, which prevents a valid comparison with the other species.

Murexsul tokubeii Nakamigawa & Habe, 1964
Figs 75-76

Murexsul tokubeii Nakamigawa & Habe, 1964: 28, pl. 2, fig. 4.

Material examined. BENTHAUS, Austral Archipelago, stn DW1881, 27°54.6' S, 143°28.5' N, 112-121 m, 1dd; stn DW1884, 27°53.75' S, 143°32.9' W, 570-620 m, 1 dd; stn DW1937, 24°39.79' S, 145°56.43' W, 469-500 m, 1 dd; stn DW1952, 23°49.2' S, 147°53.37' W, 300-372 m, 2 lv.; stn DW1979, 23°21.74' S, 150°43.87' W, 176-340 m, 1dd (all MNHN).

Distribution. Specimens of *M. tokubeii* have been recorded from southern Japan, Taiwan and the Philippines. The specimens reported from South Africa are conspecific with *M. marianae* (Houart, 2003) (see Remarks). The discovery of typical specimens in the Austral Archipelago means a geographical range extension of over 10,000 km in the Pacific.

Remarks. The shells illustrated by Houart (1991) as *Murexsul tokubeii* from South Africa are conspecific with *Murexsul marianae* (Houart, 2003), originally described as *Favartia*. It differs from the typical *M. tokubeii* in having a comparatively broader last teleoconch whorl, lower varices, a narrower siphonal canal, more uniformly sized and more crowded primary cords, and in having the median primary cord on the siphonal canal being closer to the aperture.

Subfamily Ergalataxinae Kuroda, Habe & Oyama, 1971

Remarks. The genus *Morula* considered in Thaidinae (= Rapaninae) by Tröndlé & Houart (1992) was moved to Ergalataxinae by Houart (2004). Several other genera included in Ergalataxinae by Tröndlé & Houart (1992) and Houart & Tröndlé (1997) are considered here as doubtful of belonging to any existing subfamily of Muricidae. Those genera are *Maculotriton*, *Phrygiomurex* and *Phyllocoma* and are listed separately until more is known about the species included in those genera. Fifteen species have been added in Ergalataxinae since Tröndlé & Houart (1992) and Houart & Tröndlé (1997), two of those are new species: *Orania maestratii* n.sp. from the Austral Islands and *O. atea* n.sp. from the Marquesas. Two species were recently described (Houart, 2000 and 2002a), ten are new records, and one species remains unidentified because of lack of material.

Cytharomorula ambonensis (Houart, 1996)
Figs 83-84

Pascula ambonensis Houart, 1996: 383, figs 17-18.

Material examined. MUSORSTOM 9, Marquesas, stn DW 1281, 7°47.8 S, 140°20.8 W, 450-455 m, 1 dd, MNHN.

Distribution. *Cytharomorula ambonensis* was described from Ambon and subsequently been recorded from a few scattered localities: Guam (RH), New Caledonia (MNHN) and Mozambique (RH).

Remarks. *Cytharomorula ambonensis* is part of a group of small species, which also includes *C. lefevreiana* (Tapparone Canefri, 1880), *P. paucimaculata* (Sowerby, 1903) and *C. danigoi* Houart, 1995. The four species live in French Polynesia and their extensive geographical range is certainly due to their planktotrophic larval development. The four species have a conical protoconch of 3+ whorls with sinusigeral notch.

Cytharomorula danigoi Houart, 1995
Fig. 82

Cytharomorula danigoi Houart, 1995: 253, figs 20, 27, 65-66.

Material examined. BENTHAUS, Austral Archipelago, stn DW 1885, 27°51.87' S, 143°32.59' W, 700-800 m, 1 dd, MNHN.

Distribution. The species was described from New Caledonia and has not been recorded again since.

Remarks. See comments under *C. ambonensis*.

Cytharomorula grayi (Dall, 1889)

Cytharomorula sp. cf. *C. grayi* – Tröndlé & Houart, 1992: 88, fig. 88

Remarks. Since Tröndlé & Houart (1992), where we had doubts about the true identity of the Marquesas species, one of us (RH) has had the opportunity to examine more material from various Indo-West Pacific localities (Houart, 1995: 254). As a result, we still cannot separate it from the West and East Atlantic *Cytharomorula grayi*. One of us (RH) still has other material to examine and compare, but until any definitive conclusion is reached, we will consider the Marquesas species as conspecific with the Atlantic one, speculating that its wide distribution is probably due to a planktotrophic life of exceptional duration.

Cytharomorula lefevreiana (Tapparone Canefri, 1880)

Remarks. The specimen illustrated as *Pascula benedicta* (Melvill & Standen, 1895), a synonym of *C. lefevreiana*, in Tröndlé & Houart (1992: fig. 45) is most probably a juvenile of *Orania simonetae* Houart, 1995 (see under that species). However, *C. lefevreiana* was commented and illustrated from the Mururoa Atoll, Tuamotus by Cernohorsky (1982: 128, figs 14-15), so that its occurrence in French Polynesia remains confirmed.

Cytharomorula paucimaculata (Sowerby, 1903)
Fig. 81

Pentadactylus paucimaculatus Sowerby, 1903: 496.
Murex dollfusi Lamy, 1938: 54, fig. 1.

Material examined. MUSORSTOM 9, Marquesas, stn DW 1148, 9°18.9' S, 140°06.3' W, 300 m, 1 dd; stn DW 1154, 7°58.5' S, 140°43.7' W, 102 m, 2 dd; stn DW 1170, 8°45.1' S, 140°13.1' W, 104-109 m, 1 dd; stn DW 1177, 8°45.1' S, 140°14.1' W, 108-112 m; stn DW 1178, 8046.1' S, 140°14.5' W, 74-75 m, 1 dd; stn DW 1182, 8°45.6' S, 140°03.9' W, 90-120 m; stn DR 1200, 9°49.9' S, 139°08.9' W, 96-100 m, 8 dd; stn DW 1204, 9°52.6' S, 139°03.2' W, 60m, 2 dd; stn DW 1209, 9°48.9' S, 139°09.5' W, 117 m, 1 dd; stn DW 1210, 9°50.4' S, 139°00.5' W, 98-100 m, 3 dd; stn DR 1223, 9°44.5' S, 138°51.3' W, 90-150 m, 2 dd; stn DR 1224, 9°44.6' S, 138°51.1' W, 115-120 m, 3 dd; stn CP 1228, 9°44.6' S, 138°51.5' W, 107-108 m, 1 dd; stn DW 1242, 10°28.1' S, 138°41.1' W, 119-122 m, 2 dd; stn DR 1254, 9°48.5' S, 139°38.1' W, 386-413 m, 3 dd; stn DR 1305, 8°54.1' S, 140°14.5' W, 90-155 m, 3 dd. BENTHAUS, stn DW 1869, 28°58.4' S, 140°15.4' W, 240-440 m, 1 lv; stn DW 1926, 24°38.16' S, 146°00.82' W, 50-90 m, 2 lv; stn 1952, 23°49.2' S, 147°53.37' W, 300-372 m, 1 dd; stn DW 1959, 23°19.77' S, 149°30.44' W, 95-380 m, 1 dd; stn DW 1996, 22°29.06' S, 151°21.93' W, 489-1050 m, 1 dd; stn DW 2013, 22°38.57' S, 152°49.73' W, 80-93 m, 1 llv., 1 dd (all MHN).

Distribution. *Cytharomorula paucimaculata* was described from Japan and is known throughout the Indo-West Pacific from scattered localities such as the Red Sea (MNHN), the Indian Ocean (MNHN), Japan (type locality), the Philippines (MNHN, RH), New Caledonia (MNHN), Fiji (Houart & Héros, in press) and the Tuamotu Archipelago (JT). It is very common in the Philippines.

Remarks. See comments under *C. ambonensis*.

Cytharomorula springsteeni Houart, 1995
Figs 14, 78-79

Cythamorula springsteeni Houart, 1995: 256, figs 26, 69-71.

Material examined. MUSORSTOM 9, Marquesas, stn DR 1197, 8°57.4' S, 140°01.9' W, 277-372 m, 1 lv; stn DW 1208, 9°48.9' S, 139°09.5' W, 117 m, 2 lv., 2 dd; stn DR 1223, 9°44.5' S, 138°51.3' W, 90 m, 4 dd; stn DR 1247, 10°34.0' S, 138°41.6' W, 1150-1250 m, 1 lv.; stn DW 1287, 7°54.5' S, 140°40.2' W, 163-245 m, 1 dd; stn DW 1288, 8°53.9' S, 139°38.0' W, 200-220 m, 7 dd; stn DR 1298, 8°49.1' S, 140°17.1' W, 305 m, 1 lv., 2 dd.
BENTHAUS, Austral Archipelago, stn DW 1979, 23°21.74' S, 150°43.87' W, 176-340 m, 1 dd; stn DW 2018, 22°37.15' S, 152°49.06' W, 770-771 m, 1 dd (all MNHN).

Distribution. Japan, Philippines, Vanuatu, Marquesas and Austral Archipelago, living at 90-305 m.

Remarks. *Cytharomorula springsteeni* was described from Mactan Island in the Philippines. Two other specimens were recorded from Vanuatu (MNHN), living at 207-280 m. The shell illustrated by Tsuchiya (2000: 38, fig. 88) as *C. pinguis* from Ogasawara Islands in Japan (no depth mentioned) is another specimen of *C. springsteeni*. The multispiral protoconch indicates a planktotrophic development; it is thus not surprising to record this species from different localities in the Pacific Ocean. The depth for a single live-collected specimen at stn DR 1247 (1150-1250 m) seems to be extreme. We would welcome other specimens to confirm this depth, which we consider doubtful.
The radula (Fig. 14) was never illustrated before. It consists of a rachidian bearing a narrow, long, central cusp, and on each side a short, narrow, lateral denticle, a long, narrow, lateral cusp bent to the outside, and small marginal folds. Lateral teeth broad and sickle-shaped.

Genus *Morula* Schumacher, 1817

The intricate history of some French Polynesian species of *Morula* was reviewed by Houart (2002a). We consider it useful to illustrate again all those species, to repeat here the introduction from Houart (2002a) and to give a summary in Table 2:

"Problems began when Pease (1868) described three species in the buccinid genus *Engina* from the Tuamotu Archipelago (then known as Paumotus): *E. nodicostata*, *E. variabilis* and *E. parva*, all of which actually belong to *Morula* (Muricidae). Problems were compounded by the fact that they have been subsequently misidentified many times.

In selecting a lectotype for *E. variabilis* from the three syntypes (MCZ), Cernohorsky (1987) noted that "Tryon (1883) considers *Engina variabilis* to be a synonym of *E. nodicostata* described by Pease (1868) one page earlier. However, Dautzenberg & Bouge (1933) insist that *Morula variabilis* is a good species and they cite several Polynesian localities where the species has been collected". Cernohorsky did not make any decision regarding *E. nodicostata*.

Cernohorsky (1987) also illustrated one of the four syntypes of *Engina parva* in ANSP, adding that all four specimens are greatly worn. The name *Engina parva* Pease, 1868 is a secondary homonym of *Ricinula parva* Reeve, 1846, both being included in *Morula*. Because all syntypes of *E. parva* are worn and faded, also because Pease's description is rather conflicting with his illustration and with the specimens, rather than to give a new name for *Engina parva* Pease (non Reeve, 1846), Cernohorsky decided to describe it as a new species with clearly recognizable holotype and paratypes. He described it as *Morula parvissima* Cernohorsky, 1987. Unfortunately, he wrongly identified *E. parva* and *E. nodicostata*, as a consequence of which *M. parvissima* becomes a synonym of *M. nodicostata*.

Tröndle & Houart (1992) concluded that *E. nodicostata* and *E. variabilis* were synonyms because I (RH) then personally examined a specimen received from ANSP labelled "type" with the note "matches the description but not the figure" (Houart & Tröndle, 1992: figs 85-86). I then examined both the "type" (ANSP 34543) and six syntypes (then MCZ 178941). When returning the loan to MCZ I indicated that the 6 syntypes of *E. nodicostata* are in fact *E. parva* Pease, 1868 = *Morula parvissima* Cernohorsky, 1987, following the conclusion of Cernohorsky (1987). In fact, the specimen labelled *E. nodicostata* which I received in loan from ANSP labelled as "type", and illustrated as the holotype in Tröndle & Houart (1992), is identical to *E. variabilis* and is certainly not a type specimen of *E. nodicostata*. The material was probably mixed at some time.

Cernohorsky (1987) illustrated the holotype of *Morula angulata* (Sowerby, 1893), and a specimen from Mururoa Atoll, Tuamotu Archipelago, which he considered to be conspecific. Having observed differences between the holotype of *M. angulata* and the specimen from Tuamotu illustrated by Cernohorsky (1987), Houart & Tröndle (1997) described the latter as *Morula cernohorskyi*. In doing that they also wrongly identified *R. parva*, but without any negative consequence. In fact, *M. parva* (Pease, 1868) [not *M.* parva (Reeve, 1845)] is the species subsequently named *M. cernohorskyi*.

Johnson (1994) selected a lectotype for *E. nodicostata* (now MCZ 260614). He mentioned also a paralectotype (MCZ 260617) where it was noted "matches the description but not the figure". These specimens are part of the above material I received on loan from MCZ (then MCZ 178941).

Wishing to classify all these species once and for all correctly, I decided to examine the whole type material in ANSP and MCZ and to compare everything, together with recently collected material".

Figures 51-68

51-55. *Favartia (Favartia) conleyi* Houart, 1999.

51. Society Archipelago, Tahiti, La Faille d'Arue, 56 m, MB, 14 mm (photo MB); **52-53.** Holotype MNHN 1023, Guam, Piti lagoon,15.2 mm (photo MNHN); **54-55.** *Favartia lillouxi* Myers & Hertz, 1999, holotype SBMNH 144184, Tahiti, off Pointe Taharaa, 12.5 mm (photo courtesy B. Myers & C. Hertz).

56. *Favartia (Favartia) maculata* (Reeve, 1845). BENTHAUS, stn DW1933, 24°40.72' S, 146°01.31' W, 500-850 m, MNHN, 11.8 mm.

57. *Favartia (Favartia) peregrina* Olivera, 1980. MUSORSTOM 9, Marquesas, stn DW1242, 10°28.1' S, 138°41.1' W, 119-122 m, MNHN, 6.2 mm.

58-59. *Favartia (Favartia) sp. cf. F. sykesi* (Preston, 1904).

58. Nuku Hiva, Taiohae, Marquesas, 40 m,RH, 14.8 mm; **59.** Nuku Hiva, Marquesas, 20-40 m, RH, 12.6 mm.

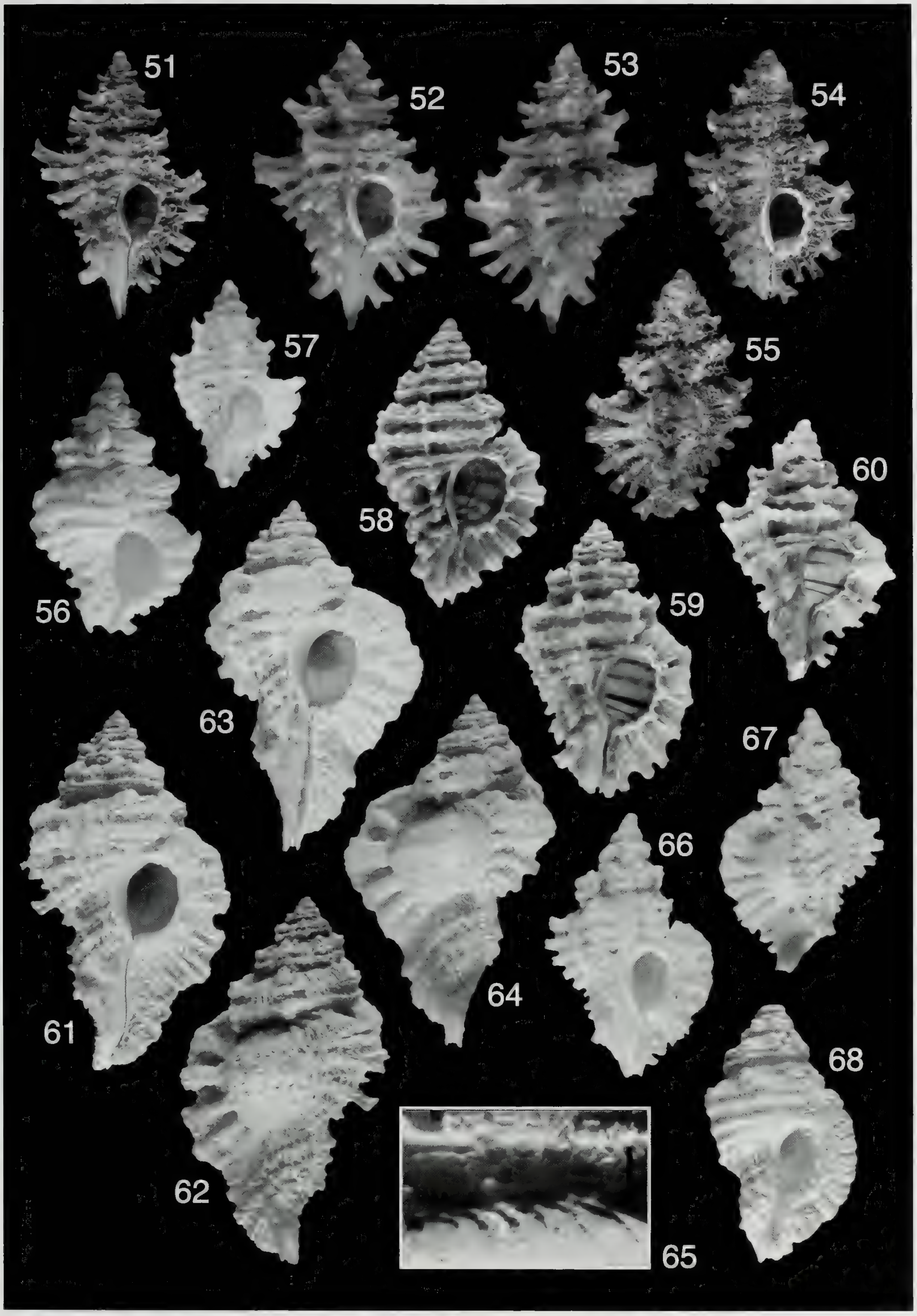
60. *Favartia (Favartia) rosamiae* D'Attilio & Myers, 1985. Nuku Hiva, Marquesas, 20-40 m, RH, 10.9 mm.

61-65. *Favartia (Favartia) salvati* Houart & Tröndlé n.sp.

61-62. Holotype MNHN 20167, 20.9 mm; **63-64.** Paratype MNHN 20170,18.2 mm; **65.** Detail of paratype (scale bar 1 mm).

66-67. *Favartia (Favartia) nivea* Houart & Tröndlé n. sp. Holotype MNHN 20171, 11.4 mm.

68. *Favartia (Pygmaepterys)* sp.1. BENTHAUS, French Polynesia, Austral Archipelago, Tubuai, stn DW1959, 23°19.77' S, 149°30.44' W, 95-380 m, MNHN, 10.11 mm.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Reeve, 1846	**Pease, 1868**	**Sowerby, 1893**	**Cernohorsky, 1987**	**Tröndlé & Houart, 1992**	**Houart & Tröndle, 1997**	**Houart, 2002**	**Current paper**
Ricinula parva **n.sp.**	....	....	*Morula parva*	....	....	*M. parva*	Not present in French Polynesia
	Engina parva **n.sp.**	....	Misidentified as *M. parvissima* n.sp.	Misidentified as *M. parvissima*	***M. cernohorskyi*** **n.sp.**	*M. cernohorskyi*	*M. cernohorskyi*
	Engina nodicostata **n.sp.**	....	Misidentified and described as ***Morula parvissima*** **n.sp.**	Misidentified as *M. parvissima*	....	*M. nodicostata*	*M. nodicostata*
	Engina variabilis **n.sp.**	....	*Morula variablis*	Considered as a synonym of *M. nodicostata*	....	*M. variabilis*	*M. variablis*
		Sistrum angulatum **n.sp.**	*M. angulata* (in part) *M. parva* (in part)	Misidentified with *M. parva*	....	*M. angulata*	*M. angulata*
				Illustrated as *M. nodicostata* (Fig. 23 only).		***M. peasei*** **n.sp.**	*M. peasei*

TABLE 2. Nomenclatural history of some *Morula* species.

Morula (Morula) anaxares (Kiener, 1835)

Fig. 80

Morula (Morula) anaxares (Kiener, 1835): 26, pl. 7, figs 17-17a.

Material examined. Society Archipelago, Huahine Is., 1 dd, MB.

Distribution. *Morula anaxares* is known to live throughout the Indo-West Pacific, from southern Africa to the Red Sea, throughout the Indian Ocean and in several localities in the Pacific Ocean. It is thus not unexpected to find that species living in French Polynesia.

Remarks. The species was mentioned in Dautzenberg & Bouge (1933) but has not been recorded again since then.

Morula (Morula) angulata (Sowerby, 1893)

Fig. 77

Sistrum angulatum Sowerby, 1893: 46, pl.4, fig. 3
Morula angulata – Kaicher, 1980: card 2446 (holotype); Cernohorsky, 1987: 100 (in part), fig. 19 (holotype); Houart & Tröndlé, 1897: figs 4-7.
NOT *Morula angulata* – Cernohorsky, 1987: 100 (in part), figs 16, 17-18, 20-21; Houart & Tröndlé, 1992: 99, fig. 76 [= *Morula cernohorskyi* Houart & Tröndlé, 1997]

Remarks (from Houart, 2002a). *Morula angulata* is a delicate, beautiful, but poorly known and probably rare species. It is unusual in having a strongly developed infrasutural cord (IP), starting on the penultimate whorl and giving rise to the longest spine on last teleoconch whorl. P1 is clearly visible on the early teleoconch whorls, but it is almost half the size of IP on the penultimate and last whorls.

Morula (Morula) cernohorskyi Houart & Tröndlé, 1997

Figs 96-97

Engina parva Pease, 1868: 276, pl.23, fig. 11 (not *Ricinula parva* Reeve, 1846)
Morula cernohorskyi Houart & Tröndlé, 1997: 4, fig. 3
Morula angulata – Cernohorsky, 1987: 100 (in part), figs 16, 17-18 (holotype of *Engina parva* Pease, 1868), 20-21; Tröndlé & Houart, 1992: 99, fig. 76 (not *Sistrum angulatum* Sowerby, 1903).

Remarks. *Morula angulata* was confused with *M. cernohorskyi* by Cernohorsky (1987), however, they differ greatly in axial and spiral ornamentation.

Morula (Morula) nodicostata (Pease, 1868)

Figs 98-99

Engina nodicostata Pease, 1868: 274, pl. 23, fig. 8
Morula parvissima Cernohorsky, 1987: 99, figs 14-15 (n.n. for *parva* Pease, not Reeve)
Engina nodicostata –Johnson, 1994: 18, pl. 23, fig. 8 (lectotype).
Morula parva –Cernohorsky, 1978: 77, figs 24, 25; Springsteen & Leobrera, 1986: 140, pl. 38, fig. 7 (not *Engina parva* Reeve, 1846).
Morula parvissima –Tröndlé & Houart, 1992: 103, fig. 78; Tsuchiya, 2000: 391, pl. 194, fig. 138.
NOT *Morula nodicostata* – Cernohorsky, 1969: 399, pl. 49, fig. 20, text fig. 17; Cernohorsky, 1972: 127, pl. 36,

fig. 5; Wells et al, 1990: 44, pl. 21, fig. 144; Wilson, 1994: 44, text fig [= *Morula purpureocincta* (Preston, 1909)]; Tröndlé & Houart, 1992: 101 (in part), figs 84-86 [= *Morula variabilis* (Pease, 1868)]; Tröndlé & Houart, 1992: 101 (in part), fig. 83 (= *Morula peasei* n.sp.); Tsuchiya, 2000: 393, pl. 195, fig. 142 (= unknown species).

Remarks. This is the species described as *Morula parvissima* by Cernohorsky (1987: 99) due to a misidentification of *Morula nodicostata* (Pease, 1868). Houart (2002a: 103, figs 14-17) illustrated the lectotype of *M. nodicostata.*

Morula (Morula) peasei Houart, 2002
Figs 93-95

Morula (Morula) nodicostata – Tröndlé & Houart, 1992: 101 (in part), fig. 83 (only).
Morula (Morula) peasei Houart, 2002a: 104, figs 32-34.

Original material examined. Society Archipelago, Tahiti, Arue, holotype MNHN 0295 and 8 paratypes (1 MNHN, 7 J. Tröndlé); Tahiti, Papara, 2 coll. R. Houart; Tahiti, Pueu, coll. R. Gourguet; Austral Is., Tubuai, 1 coll. R. Houart.

Additional material. Atelier RAPA, French Polynesia, Austral Archipelago, Rapa, SE of Tematapu Pt, stn 35, 27°34.8' S, 144°19.0' W, 2 m, 2 dd; North of Anatakuri Bay, stn 38, 27°37.4' S, 144°18.4' W, 2 m, 1 lv.; north of Rapa Iti Id, stn 40, 27°37.2' S, 144°18.3' W, 2 m, 1 dd; Haurei Bay, Teakaurare Pt, stn 76, 27°.36.9' S, 144°20.4' W, tide, 1 lv; Haurei Bay, stn 77, 27°37.2' S, 144°19.8' W, tide, 1 lv; Maomao Pt, stn 78, 27°36.6' S, 144°18.9' W, tide, 2 lv; Akatanui, stn 81, 27°35.9' S, 144°18.5' W, rocks, 2 lv., 2 dd; Anarua Bay, stn 87, 27°36.4' S, 144°22.6' W, 2 m, 4 lv.; Tekogoteemu Pt, stn 88, 27°36.4' S, 144°18.6' W, tide, 1 lv.; Tupuaki Bay, Kotuaie Pt, stn 93, 27°34.6' S, 144°20.6' W, tide, 5 lv. (all MNHN).

Distribution. Currently known as endemic in French Polynesia, in the Society Archipelago (Tahiti), in Tubuai, and now in Rapa.

Remarks. *Morula peasei* differs from *M. variabilis* (Pease, 1868) in being more weakly shouldered, in having a higher spire, more similar-sized spiral cords, a broader aperture with smaller (probably split) denticles within, and an abapically broader columellar lip. The shell also lacks orange colored nodes and has a lighter colored aperture. The shell attains a maximum length of 13.24 mm (MNHN, atelier Rapa, stn 78).

Morula (Morula) rodgersi Houart, 2000
Figs 89-92

Morula rodgersi Houart, 2000 : 101, figs 1-3.

Material examined. Tuamotu Archipelago, Takaroa Atoll, Secteur de Nake, 1 dd (MB).

Distribution. Western Guam, Agat Bay and Piti Lagoon, 6-9 m (type locality); Tuamotu Archipelago, Takaroa Atoll; South Mozambique, trapped alive in 70-120 m, near Macanza (coll. Manuel Amorim).

Remarks. The single specimen recorded in the Tuamotu Archipelago was dead-collected and worn but its conspecificity with *M. rodgersi* is unquestionable.

Morula (Morula) variabilis (Pease, 1868)
Figs 100-101

Engina variabilis Pease, 1868: 275, pl. 23, fig. 9
Morula variabilis – Cernohorsky, 1987: 99, figs 12-13 (lectotype).
Engina variabilis – Johnson, 1994: 27, pl. 7, fig. 5 (lectotype).
Morula nodicostata –Tröndlé & Houart, 1992: 101 (in part), figs 84-86 (not *Engina nodicostata* Pease, 1868).

Distribution. Tuamotu Archipelago and Tubuai.

Morula (Morula) zebrina Houart, 2004
Figs 111-114

Sistrum striatum Pease, 1868: 276, pl. 23, fig. 2.
Morula striata (Pease, 1868) – Tröndlé & Houart, 1992: 103, fig. 79.
Morula (Morula) zebrina Houart, 2004: 114 (new name for *Sistrum striatum* Pease, 1868, not *Engina striata* Pease, 1868).

Remarks. Described from French Polynesia, *Sistrum striatum*, now included in *Morula*, is a secondary junior homonym of *Engina striata* (Pease, 1868), also a *Morula* species. It is interesting to note, and open to question, that *M. zebrina* has not been found outside of the French Polynesian geographical range, notwithstanding its multispiral protoconch with sinusigeral notch, which indicates a planktotrophic larval development.
See under *Morula (Habromorula) striata* for a comparison of those species.

Morula (Habromorula) ambrosia Houart, 1994
Fig. 102

Habromorula ambrosia Houart, 1995: 24, figs 3, 17-19.
?*Morula (?Morula) pacifica* – Tröndlé & Houart, 1992: 102 (in part).

Material examined. Atelier RAPA 2002, stn 2, 27°34.4' S, 144°19.0' W, 29 m, 1 dd; stn 29 m; stn 8, 27°36.5' S, 144°17.7' W, 52-57 m, 1 lv; stn 8, 27°36.5' S, 144°17.7' W, 52-57 m, 1 lv; stn 22, 27°33.9' S, 144°21.7' W, 18-22 m, 1 lv, 1 dd; stn 30, 27°38.2' S,

144°18.2' W, 16-20 m, 1 lv; stn 50, off Baie Anarua, 19 m, 1 lv.
Tuamotu, Kaurura, on the beach, 1 dd, JT; Anaa, on the beach, 1 dd, JT; Mururoa, on the beach, 1 dd, JT.
Society Archipelago, Tahiti, Punaauia, 30 m, 1 dd, JT.

Distribution. Central and South Pacific Ocean, Okinawa, the Philippines, Guam, New Caledonia, Marshall Islands and French Polynesia.

Remarks. This species was erroneously identified as *?Morula (?Morula) pacifica* Nakayama, 1988 from the Tuamotu Archipelago in Tröndlé & Houart (1992). However, *Orania pacifica* is present in the Marquesas Archipelago.

Morula (Habromorula) dichrous (Tapparone Canefri, 1880)

Fig. 103

Morula (Spinidrupa) bicatenata – Tröndlé & Houart, 1992: 105 (in part), fig. 88 (only).
Murex dichrous Tapparone Canefri, 1880: 21, pl. 2, fig. 5, 6.

Material examined. Society Archipelago, Tahiti, Toahotu, 1 lv., RH; Tahiti, Tautira, in coral holes, 1 lv., RH; Tahiti, Hitiaa, reef, under dead coral, 1 lv., 1 dd, JT.

Distribution. *Morula dichrous* is known from a few scattered localities in the Indo-West Pacific: Mauritius, Madagascar, the Coral Sea, the Philippines, Guam and French Polynesia. It is obvious that its full range remains little known and that it will likely be found in other localities in the future.

Remarks. *Morula dichrous* was misidentified as *M. bicatenata* in Tröndlé & Houart (1992), however it was separated from that species by Houart (2004) because of the broader, weakly flattened, more serrate spiral cords, the broader siphonal canal, the more elongate, convex shell outline, and the broader axial ribs.

Morula (Habromorula) striata (Pease, 1868)

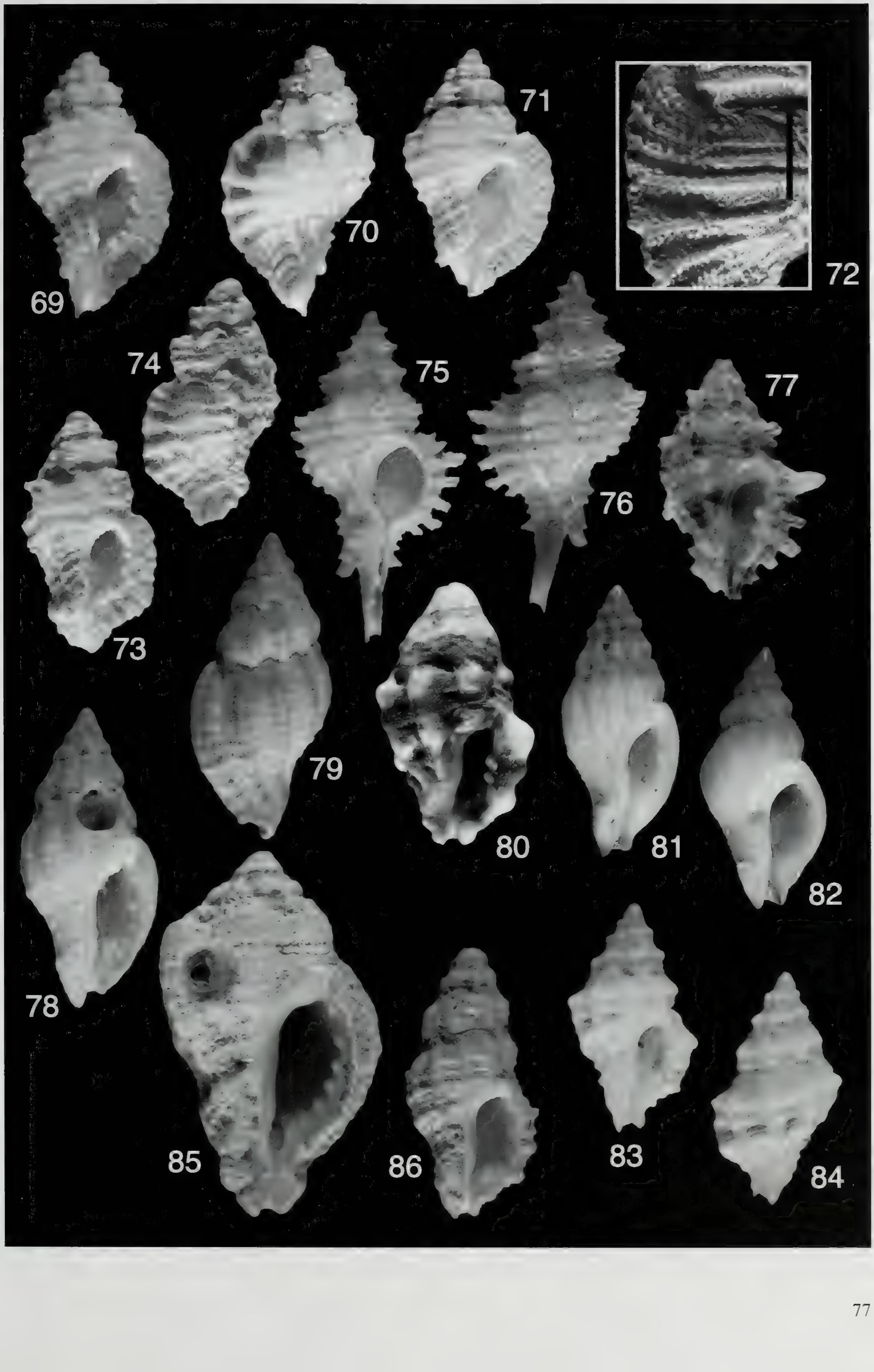
Figs 115-116, 130

Engina striata Pease, 1868: 275, pl. 23, fig. 18 (fig. 10 in error).

Remarks. *Morula striata* differs from *Morula zebrina* in having more numerous, narrower, more obvious spiral cords on all the whorls, including on the shoulder and on the siphonal canal, and in having comparatively narrower varices and a higher aperture.
The holotype of *Morula striata* described from Paumotus (Tuamotus) is not in ANSP (Johnson, 1994) nor in the BMNH, however the original illustration of Pease (Fig. 130) shows a shell of approximately 10 mm in length, with strongly carinate whorls, narrow varices and numerous fine spiral cords as observed in specimens of *M. striata* from many Indo-West Pacific localities (see Houart, 2004). To date, no specimens of *M. striata* have been recorded from French Polynesia notwithstanding the numerous lots examined. The record of *M. (H.) striata* from Rapa by Lozouet et al (2004: 29, figs 15-16) is based on two specimens of *M. zebrina*.

Figures 69-86

69-72. *Favartia (Pygmaepterys) avatea* Houart & Tröndlé n.sp.
69-70. Holotype MNHN 20172, 11.2 mm; 71. Paratype MNHN 20173, 9.6 mm; 72. Detail of holotype (scale bar 2 mm).
73-74. *Favartia (Pygmaepterys)* sp. 2. BENTHAUS, French Polynesia, Austral Archipelago, Rimatara, stn DW2020, 22°36.96' S, 152°49.13' W, 920-930 m, MNHN, 9.36 mm.
75-76. *Murexsul tokubeii* Nakamigawa & Habe, 1964. BENTHAUS, Austral Archipelago, stn DW1952, 23°49.2' S, 147°53.37' W, 300-372 m, MNHN, 14.5 mm.
77. *Morula (Morula) angulata* (Sowerby, 1893), Society Archipelago, Tahiti, west coast, coll. Wargnier, 6.7 mm (from Houart& Tröndlé, 1997).
78-79. *Cytharomorula springsteeni* Houart, 1995. BENTHAUS, Austral Archipelago, stn DW 2018, 22°37.15' S, 152°49.06' W, 770-771 m, MNHN, 12.4 mm.
80. *Morula (Morula) anaxares* (Kiener, 1835). Society Archipelago, Huahine, MB, 11.1 mm.
81. *Cytharomorula paucimaculata* (Sowerby, 1903). MUSORSTOM 9, Marquesas, stn DW 1869, 28°58.4' S, 140°15.4' W, 240-440 m, MNHN, 10.2 mm.
82. *Cytharomorula danigoi* Houart, 1995. BENTHAUS, Austral Archipelago, stn DW 1885, 27°51.87' S, 143°32.59' W, 700-800 m, MNHN, 9.7 mm.
83-84. *Cytharomorula ambonensis* (Houart, 1996). MUSORSTOM 9, Marquesas, stn DW 1281, 7°47.8 S, 140°20.8 W, 450-455 m, MNHN, 7.2 mm.
85. *Muricodrupa fiscella* (Gmelin, 1791). Marquesas, Tröndlé & Tardy, stn 34; Ua Huka, 8°56’80”S, 139°35’70”W, 10-15 m., MNHN, 16.3 mm.
86. *Orania archaea* Houart, 1995. Marquesas, stn 1281, 7°47°.8' S, 140°20.8' W, 450-455 m, MNHN, 11.8 mm.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All lots examined from French Polynesia turned out to be *M. zebrina* of which some forms are close to *M. striata* but all with broader, less numerous spiral cords, broader varices, and a shorter aperture, as in typical *M. zebrina*.

Pease (1868: 276) wrote that he found only a single, apparently not mature specimen of that species, associated with *Engina variabilis* (= *Morula variabilis*). As the species was never recorded again from French Polynesia since its description, it is thus questionable whether or not it lives there. The nearest locality where *M. striata* has been recorded to date (RH) is Pago Pago in Tutuila Is., American Samoa (Figs 115-116), some 3500 km from the Tuamotus.

Muricodrupa fiscella **(Gmelin, 1791)**

Fig. 85

Murex fiscellum Gmelin, 1791 : 3552, ref. Chemnitz v.10, pl. 160, figs 1524, 1525.

Material examined. MUSORSTOM 9, Marquesas, stn DW 1204, 9°52.6' S, 139°03.2' W, 60-62 m, 1 lv.; coll. Von Cosel, Tröndlé & Tardy, Ua Huka, stn 34, 8°56'80"S, 139°35'70"W, 10-15 m., 2 dd..

Distribution. Throughout the Indo-West Pacific.

Remarks. The list of synonyms for this species is extensive (see Houart, 1995: 264) due to the great variabilty of shell characters. *M. fiscella* is a common species, so that enough material is available to compare it very carefully. However, as in *Maculotriton serriale* (see further), all attempts to separate the different varieties based on shell characters failed because of the occurrence of intermediate forms.

Orania archaea **Houart, 1995**

Fig. 86

Lataxiena (Orania) archaea Houart, 1995: 267, figs 22, 44, 127-132

Material examined. MUSORSTOM 9, Marquesas, stn 1281, 7°47°.8' S, 140°20.8' W, 450-455 m, 2 dd.

Distribution. *Orania archaea* was described from the Philippines with a range extending to Taiwan, Christmas Is. (Indian Ocean), and New Caledonia. Other specimens were collected alive in Hawaii. The discovery of specimens in the Marquesas was not unexpected, but live specimens will be welcome to confirm the presence of that species in French Polynesia.

Orania simonetae **Houart, 1995**

Figs 117-121

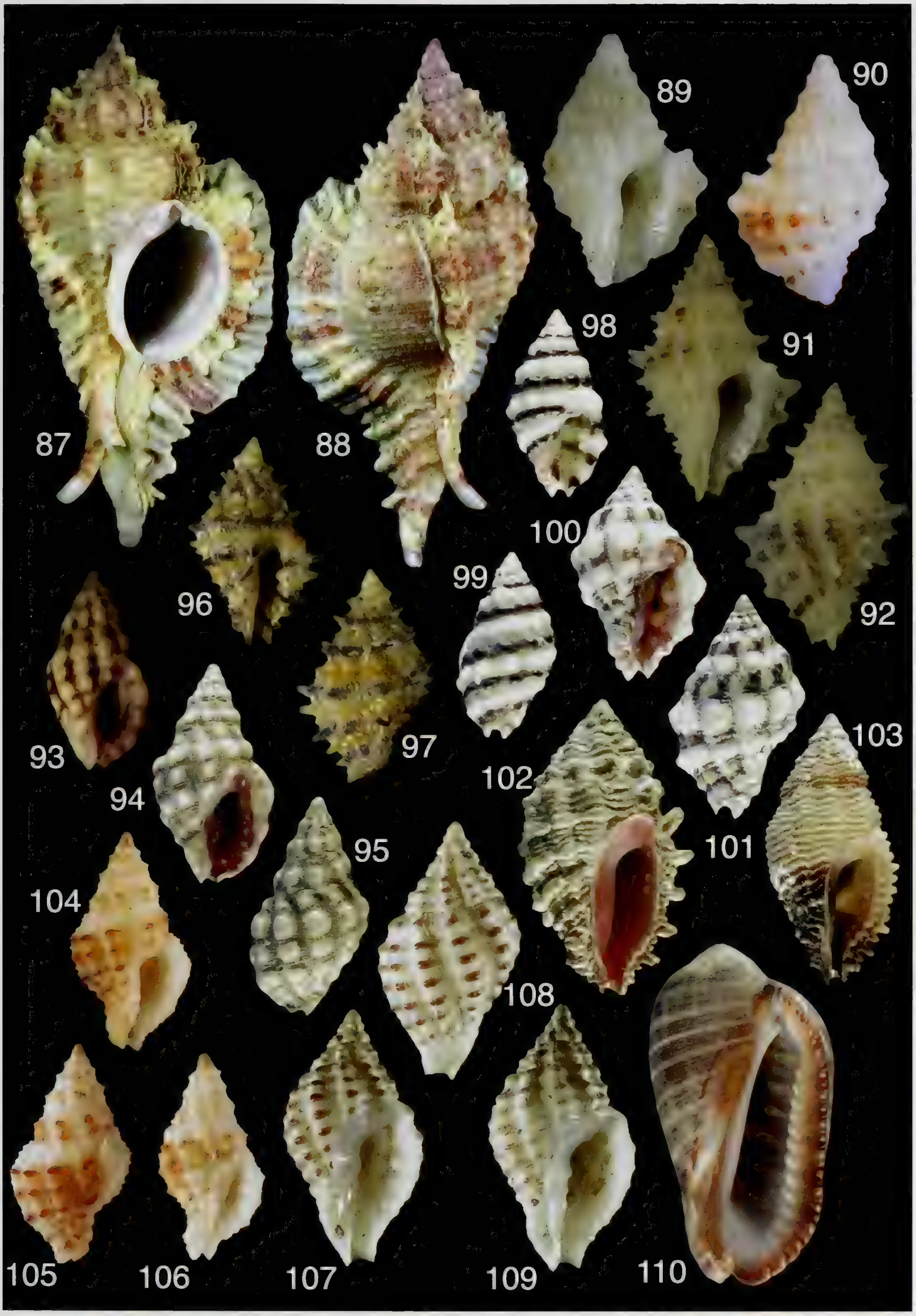
Pascula benedicta – Tröndlé & Houart, 1992: 87, fig. 45 (not *Murex benedictus* Melvill & Standen, 1895).
Orania simonetae Houart, 1995: 272, figs 140-141.

Material examined. BENTHAUS, Austral Archipelago, stn DW 1926, 24°38.16', 146°00.82' W, 50-90 m, 2 lv. Tuamotu, Anaa, on the beach, 1 dd, JT (as *P. benedicta* in Tröndlé & Houart, 1992); Mururoa, on the beach, 1 dd, JT (as *P. benedicta* in Tröndlé & Houart, 1992).

Society Archipelago, Tahiti, Arue fault, 50-60 m, 1 dd, MB.

Figures 87-110

87-88. *Naquetia barclayi* (Reeve, 1858). MUSORSTOM 9, Marquesas, Ua Pou, stn CP1265, 9°20.4' S, 140°07.3 W, 90-92 m, MNHN, 102.5 mm, (photo P. Maestrati, MNHN).
89-92. *Morula (Morula) rodgersi* Houart, 2000
89-90. Tuamotu Archipelago, Takaroa atoll, Secteur de Nake, MB, 9.2 mm; **91-92.** Holotype MNHN 0911, Guam Piti lagoon, 10.9 mm (photo MNHN).
93-95. *Morula (Morula) peasei* Houart, 2002
93. Holotype MNHN 0295, Society Archipelago, Tahiti, Arue, 8.9 mm (photo MNHN); **94-95.** Atelier RAPA, French Polynesia, Austral Archipelago, Rapa, Haurei Bay, stn 77, 27°37.2' S, 144°19.8' W, tide, MNHN, 11 mm.
96-97. *Morula (Morula) cernohorskyi* Houart & Tröndle, 1997. Holotype MNHN 0071, Tuamotu Archipelago, Mururoa Atoll, 22°00' S, 140°00' W, 6 mm (photo MNHN).
98-99. *Morula (Morula) nodicostata* (Pease, 1868). Society Archipelago, Tahiti, RH, 6.4 mm.
100-101. *Morula (Morula) variabilis* (Pease, 1868). Austral Archipelago, Tubuaï, RH, 7.2 mm.
102. *Morula (Habromorula) ambrosia* Houart, 1994. Austral Archipelago, Rapa, SE of Tauna Id, 27°36.5' S, 144°17.7' W, 52-57 m, MNHN, 17.5 mm.
103. *Morula (Habromorula) dichrous* (Tapparone Canefri, 1880). Society Archipelago, Tahiti, Toahotu, RH, 13.3 mm.
104-106. *Orania maestratii* Houart & Tröndlé n.sp.
104-105. Holotype MNHN 20175, 10.1 mm; **106.** Paratype MNHN 20176, 8.9 mm.
107-109. *Orania atea* Houart & Tröndlé n.sp.
107-108. Holotype MNHN 20178, 12.3 mm; **109.** Paratype MNHN 20179, 12.9 mm.
110. *Vexilla taeniata* (Powis, 1835). Tuamotu Archipelago, Rangiroa, RH, 24.7 mm.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Remarks. The new material collected in Rapa is most probably conspecific with *O. simonetae* and with the specimens wrongly identified as *Pascula benedicta* by Tröndlé & Houart (1992: 87, fig. 45). The five additional specimens examined are subadult with 3 or 4 teleoconch whorls and a maximum length of 10.3 mm (MNHN). The holotype of *O. simonetae* (Figs 117-118) has 6 teleoconch whorls.

The spiral ornamentation of the last teleoconch whorl in *O. simonetae* looks as follows: adis, IP, abis, P1, s1, P2, s2, p3, s3, P4, s4, P5, (t), s5, t, P6, s6 (t), ADP, MP. One or two additional tertiary cords may be present between s6 and ADP.

P1-P3 similar in size, P4 smaller, P5 broadest and highest cord, s5 highly variable, occasionally as high and strong as P5, P6 and other abapical cords lower.

Orania atea **n. sp.**

Figs 9, 15, 107-109

Type material. MUSORSTOM 9, Marquesas, Eiao Is., stn DW 1287, 7°54' S, 140°40' W, 163-245 m, holotype MNHN 20178.

Paratypes: Marquesas, Eiao Is., MUSORSTOM 9, stn DW 1287, 7°54' S, 140°40' W, 163-245 m, 10 MNHN 20179, 2 RH.

Other material examined. MUSORSTOM 9, stn DW 1146, 9°19' S, 140°06' W, 200 m, 18 lv. & dd; stn DW 1148, 9°19' S, 140°06' W, 300 m, 10 lv. & dd; stn DR 1197, 9°57' S, 140°02' W, 277-372 m, 1 lv., 1 dd; stn DR 1199, 9°49' S, 140°00' W, 210-258 m, 41 lv. & dd; stn DR 1200, 9°49.9 S, 139°08.9' W, 96-100 m, 1 dd; stn DW 1201, 9°51' S, 139°09' W, 275-300 m, 8 lv & dd; stn DW 1206, 9°51' S, 139°09' W, 352-358 m, 1 lv.; stn DW 1222, 9°44' S, 138°51' W, 340-352 m, 3 dd; stn DR 1231, 9°42' S, 139°05' W, 270-285 m, 1 lv., 2 dd; stn DW 1287, 7°54' S, 140°40' W, 163-245 m, 58 lv. & dd; stn DW 1288, 8°54' S, 139°38' W, 200-220 m, 24 dd.

Type locality. French Polynesia, Marquesas Archipelago, Eiao Is., 7°54' S, 140°40' W, 163-245 m.

Distribution. French Polynesia, Marquesas Archipelago, living at 163-352 m.

Description. Shell medium sized for the genus, average size between 11 and 13 mm in length at maturity, biconical, broadly ovate, heavy, nodose. Length/width ratio 1.73-1.88. Shoulder strongly sloping, weakly concave. Creamy white with knobs of spiral cords topped with light or dark brown. Aperture glossy white.

Spire high with 4 protoconch whorls and teleoconch up to 5 broad, convex, weakly shouldered, nodose whorls. Suture impressed. Protoconch large, conical, smooth, glossy, with a narrow keel abapically on 3 abapical whorls; first whorl small, last whorl broad, strongly convex. Terminal lip heavy, erect, of sinusigera type, partially covered with first teleoconch whorl.

Axial sculpture of teleoconch whorls consisting of high, broad, nodose ribs. First and second whorls with 8 or 9 ribs, third with 8-10, fourth with 10 or 11, last whorl with 8 or 9 ribs. Intersection of axial ribs and spiral cords giving rise to low, elongate nodes. Spiral sculpture of narrow, moderately high primary cords and low, narrow, secondary and tertiary cords. First teleoconch whorl with visible P1 and P2, second whorl with P1 and P2, starting s1, third whorl starting SP, adis, IP, abis, P1, s1, (t), P2, fourth whorl with SP, adis, IP, abis, P1, t, s1, t, P2, t, s2, last teleoconch whorl with SP, adis, IP, abis, P1, t, s1, (t), P2, (t), s2, P3, (t), s3, P4, (t), sA, (t), P5, (t), s5), (t), P6, (t), s6, ADP, ads. P3 & P4 approximately of similar size. Subsutural cord (SP) occasionally broader and higher. P5 and P6 weakly narrower, ADP small. secondary and tertiary cords of similar strength.

Aperture large, broad, roundly ovate; columellar lip broad, with two strong knobs in center, extending into aperture, abapical knob weaker; strong parietal tooth at adapical extremity. Rim very weakly erect abapically, adherent adapically; occasionally completely adherent. Anal notch deep, broad. Outer lip broad, with strong denticles within: ID, D1-D2 fused, D3, D4, D5, decreasing in strength abapically. Siphonal canal short, broad, weakly dorsally recurved, broadly open.

Operculum light brown, with subapical nucleus (Fig. 9). Radula (Fig. 15) with a rachidian bearing a long, narrow, central cusp, a short, moderately broad lateral denticle, occasionally flanked by a small inner lateral denticle, a broad, long, lateral cusp, 2 or 3 marginal, low denticles, and a short, broad, marginal cusp. Lateral teeth sickle-shaped with broad base.

Remarks. There are a few Indo-West Pacific species of *Orania* with strong columellar denticles or folds, and with a multispiral, planktotrophic, conical protoconch. In general they differ strongly from *O. atea.*

Orania corallina (Melvill & Standen, 1903) has a more globose last teleoconch whorl, fewer secondary cords, a broader aperture, smaller, more irregular columellar folds and a narrower protoconch with more rounded whorls.

Orania fischeriana (Tapparone Canefri, 1882) also has a broader last teleoconch whorl, together with 4 narrow, regularly shaped folds, extending into the aperture *vs.* 2 broad ones in *O. atea*, fewer secondary spiral cords, and narrower folds inside of the outer apertural lip.

Orania ficula (Reeve, 1848) has a smooth columellar lip, but it occasionally bears 1 or 2 shallow folds; however, *O. ficula* has different spiral cord morphology, a narrower, less deep anal notch, narrower folds into the outer apertural lip, and a smaller, narrower protoconch.

Orania pleurotomoides (Reeve, 1845) also has different spiral cord morphology, together with a more spiny shell with a broader last teleoconch whorl, a broader, more weakly sloping shoulder, and a longer, narrower siphonal canal.

Orania ornamentata Houart, 1995 is a much more elongate shell with most often a smooth columellar lip and very different spiral sculpture, consisting of numerous primary and secondary cords of approximately similar strength.

Etymology. In the mythology of the Marquesas Islands, Atea is the god of light.

***Orania maestratii* n. sp.**

Figs 104-106

Type material. BENTHAUS, French Polynesia, Austral Archipelago, Rapa Is., stn DW 1894, 27°40.13' S, 1440°21.51' W, 100m, holotype MNHN 20175.

Paratypes: BENTHAUS, French Polynesia, Austral Archipelago, Rapa Is., stn DW 1894, 27°40.13' S, 1440°21.51' W, 100m, 3 MNHN 20176; Neilson Reef, stn DW 1914, 27°03.52' S, 146°04.1' W, 150 m, 7 MNHN 20177, 1 RH.

Other material examined. BENTHAUS, stn DW 1868, 28°58.9 S, 140°14.07' W, 173-250 m, 1 dd; stn DW 1877, 28°59.012', 140°15.102' W, 59-150 m, 1 lv. & 1 dd, 1 dd; stn DW 1878, 27°51.59' S, 143°32,68' W, 750-1000 m, 1 dd; stn DW 1880, 27°55' S, 143°29.4 W, 90-94 m, 3 lv.; stn DW 1888, 27°51.38' S, 143°31.42' W, 100-120 m, 2 lv.; stn DW 1889, 27°36.87' S, 144°15.75' W, 600-620 m, 2 dd; stn DW 1894, 27°40.13' S, 144°21.51' W, 100m, 4 lv.; stn DW 1901, 17°24.8' S, 144°01.67' W, 115-120 m, 3 lv.; stn DW 1905, 27°25.36' S, 144°02.62' W, 120-140 m, 1 dd; stn CP 1906, 27°24.78' S, 144°01.75' W, 110-127 m, 1 dd; stn DW 1913, 27°01.5' S, 146°00.3' W, 120 m, 2 lv. (RH); stn DW 1914, 27°03.52' S, 146°04.1' W, 150 m, 8 lv. & dd; stn CP 1918, 27°03.45' S, 146°03.96' W, 130-140 m, 2 lv.; stn CP 1920, 27°03.58' S, 146°03.84' W, 120-203 m, 4 lv.; stn CP 1922, 27°03.67' S, 146°03.93' W, 150-163 m, 3 dd; stn DW 1926, 24°38.16' W, 146°00.82' W, 50-90 m, 1 lv.; stn DW 1927, 24°39.03' S, 146°01.58' W, 95-105 m, 1 lv; stn DW 1936, 24°39.71', 145°57.09' W, 80-100m, 1 lv.; stn DW 1948, 23°48.7' S, 147°53.5' W, 120-280 m, 1 dd; stn DW 200122°26.6 S, 151°20.1' W, 200-550 m, 1 dd; stn no data, 5 dd.

Type locality. French Polynesia, Austral Archipelago, Rapa Is., 27°40.13' S, 144°21.51' W, 100m, lv.

Distribution. Austral Archipelago, living at 59-150 m.

Description. Shell small for the genus, up to 11.4 mm in length at maturity (MNHN), biconical, shouldered, squamous. Length/width ratio 1.8-2.0. Shoulder strongly sloping, weakly concave. White with light orange to chestnut-brown colored spiral cords, lighter colored between spiral cords, darker on top of nodes, protoconch light brown, shoulder and aperture white, siphonal canal brown.

Spire high with 4.75 protoconch whorls and up to 6 broad, strongly shouldered whorls, suture adpressed. Protoconch high, narrow, conical, smooth, with a narrow keel abapically on 3 or 4 abapical whorls. Terminal lip raised, strongly curved, of sinusigera type.

Axial sculpture of teleoconch whorls of moderately high, broad, nodose ribs; 9 or 10 on first whorl, 9 on second, 8 or 9 on third and fourth, 6-8 on last whorl. Last whorl occasionally with a single, erratically placed broad varix. Other axial sculpture occasionally of low growth lamellae, more apparent on shoulder. Spiral sculpture of high, narrow, primary and small, narrow, secondary cords. First whorl with visible, high, narrow P1, second with P1 and P2, P2 partially covered by next whorl, third whorl with P1 and P2 or P1, s1, P2, fourth with P1, s1, P2, starting very low and squamous adis, IP, abis. Last whorl with low, squamous adis, IP, abis and P1, s1, P2, s2, P3, s3, P4, s4, P5, (s5). Intersection of axial ribs and spiral cords giving rise to broad nodes. P1-P3 almost similar in size and strength, P4 lower and narrower, P5 smallest.

Aperture small, narrow, ovate; columellar lip narrow, smooth or with 1 or 2 weak knobs abapically, rim weakly erect, adherent at abapical extremity, low parietal node at adapical extremity. Anal notch moderately deep, broad. Outer lip broad, squamous, with 5 denticles within: ID very low or moderately high, D1 high, broad, strongest denticle, D2-D5 lower, of approximately similar strength. Siphonal canal short, broad, weakly recurved dorsally, broadly open.

Operculum and radula not examined.

Remarks. There are currently 29 Recent species included in *Orania* of which only the type species, *O. fusulus* (Brocchi, 1814), does not occur in the Indo-West Pacific.

Orania archaea Houart, 1995, described from the Philippines and with two specimens recorded here from the Marquesas, differs in being comparatively larger and more scaly, and in having more numerous secondary and tertiary spiral cords between P1-P5, a smooth columellar lip, and in having more elongate, lower, more numerous denticles within the aperture.

Orania fischeriana (Tapparone-Canefri, 1882) known from various Indo-West Pacific localities is a species with a broader, less scaly shell with a narrower spire and broader axial ribs. The aperture is also broader with a strongly folded columellar lip and narrow lirae within the outer lip.

Orania mixta Houart, 1995 from the Philippines is comparatively larger with broader axial ribs, broader secondary spiral cords and a narrower, longer siphonal canal. The aperture is comparatively broader with a smooth columellar lip and weak, elongate denticles within the outer lip.

Orania pleurotomoides (Reeve, 1845) from the Philippines and Indonesia is also relatively larger with a much broader last teleoconch whorl and with obvious, more numerous primary spiral cords. The columellar lip has more obvious nodes and a strong parietal node. The anal notch is narrower and deeper and the outer apertural lip has strong, elongate denticles within.

Orania taeniata Houart, 1995 was described from Christmas Island, in the Indian Ocean and is also known from the Solomon Islands (AMS C.322354). It is a small shell of less than 9 mm in length like *O. maestratii*. However, it differs in having a less scaly, more ovate shell with more strongly developed and more equally sized spiral cords, a strong subsutural spiral cord, a more ovate aperture with a straighter columellar lip and a narrower anal sulcus. The protoconch of *O. taeniata* is also broader and the siphonal canal is narrower.

All other *Orania* species with a multispiral conical protoconch are very different and do not need to be compared here.

Etymology. Named after Philippe Maestrati from MNHN.

Pascula darrosensis (E.A. Smith, 1884)

Fig. 122

Murex (Ocinebra) darrosensis E.A. Smith, 1884 : 429, pl. 44, fig. f.

Material examined. MUSORSTOM 9, Marquesas, stn DR 1151, 9°19', 4' S, 140°03.7' W, 70 m, 1 dd; stn CP 1158, 7°58.7' S, 140°43.9' W, 109-110 m, 1 dd; stn DW 1161, 8°55.6' S, 140°06.1' W, 30-37 m, 8 dd; stn DW 1162, 8°56.2' S, 140°06.1' W, 45-64 m, 2 dd; stn DW 1170, 8°45.1' S, 140°13.1' W, 104-109 m, 2 dd; stn DR 1181, 8°45.5' S, 140°03.2' W, 102-130 m, 3 dd; stn DR 1197, 8°57.4' S, 140°01.9' W, 277-372 m, 1 dd; stn DR 1200, 9°49.9' S, 139°08.9' W, 96-100 m, 1 dd; stn DW 1203, 9°52.7' S, 139°02.2' W, 60-61 m, 14 dd; stn DW 1204, 9°52.6' S, 139°03.2' W, 60-62 m, 31 dd; stn DW 1208, 9°48.9' S, 139°09.5' W, 117 m, 1 dd; stn DW 1210, 9°50.4' S, 139°00.5' W, 98-100 m, 1 lv.; 2 dd, stn DR 1223, 9°44.5' S, 138°51.3' W, 90-150 m, 1 dd; stn DR 1247, 10°34.0' S, 138°41.6' W, 1150-1250 m, 4 dd; stn DR 1254, 9°48.5' S, 139°38.1' W, 386-413 m, 1 dd; stn DR 1293, 8°54.3' S, 139°37.5' W, 50 m, 13 dd; coll. Von Cosel, Tröndlé & Tardy, stn 30, Ua Huka, 8°56'10"S, 139°32'00"W, 20-30 m, 6 dd.

Distribution. *Pascula darrosensis* was described from Darros Island, in the Amirantes. Other records are currently known from Zululand, South Africa (NM D5365), the Coral Sea (AMS C170062), Papua New Guinea (RH), New Caledonia (MNHN) and the Philippines (MNHN, RH).

Remarks. None of the specimens recorded from French Polynesia reach a length over 8 mm, but all of them have only 3 to 3.5 teleoconch whorls while the holotype and other specimens from 10 mm up have 4 to 4.5 whorls.

?*Pascula ozenneana* (Crosse, 1861)

Figs 10, 18-19

Ricinula ozenneana Crosse, 1861: 285.

Remarks. Radwin & D'Attilio (1976: 146) tentatively assigned this species to the muricopsine genus *Favartia* as ?*Favartia crossei* (Lienard, 1873), a junior synonym of *R. ozenneana*. Later, the radula was illustrated in a drawing by Cernohorsky (1980: 174, fig. 11), as *Cronia gibba* (Pease, 1865), another junior synonym. Finally, Tröndlé & Houart (1992: 88) recorded it as *Pascula ozenneana*.

Figures 111-127

111-114. *Morula (Morula) zebrina* Houart, 2004.

111. Society Archipelago, Tahiti, RH, 14.6 mm; **112.** Mahina, RH, 9.7 mm; **113.** Papara, RH, 12.5 mm; **114.** Afaahiti, JT, 9.5 mm.

115-116. *Morula (Habromorula) striata* (Pease, 1868). American Samoa, Pago Pago, Tutuila Id, RH, 12.9 mm.

117-121. *Orania simonetae* Houart, 1995

117-118. Holotype MNHN 0283, Marquesas Islands, Nuku Hiva, 12.5 mm (photo MNHN); **119-121.** Austral Archipelago, stn DW 1926, 24°38.16', 146°00.82' W, 50-90 m, MNHN, 10.3 mm & 8.9 mm.

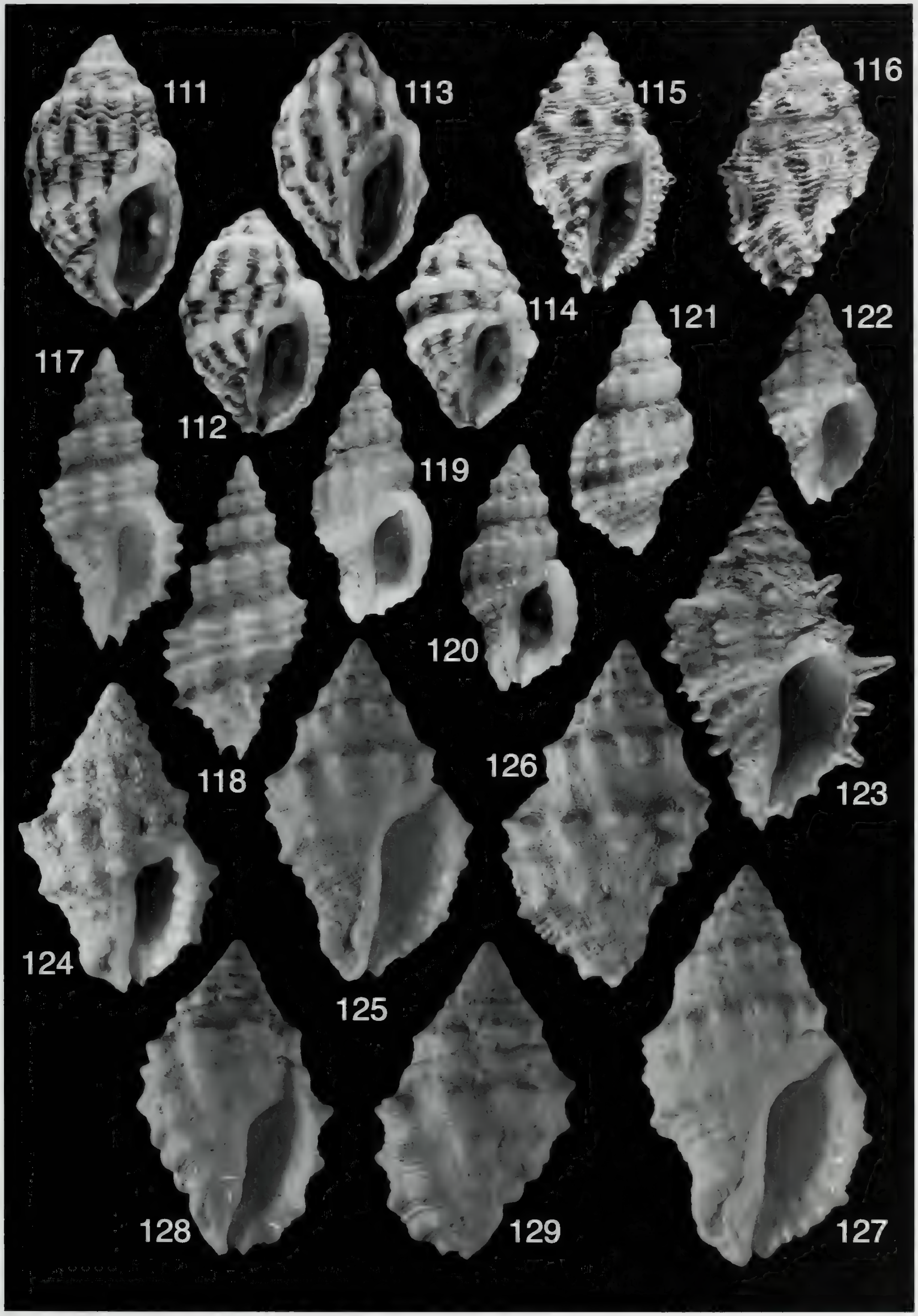
122. *Pascula darrosensis* (E.A. Smith, 1884). MUSORSTOM 9, Marquesas, stn DW 1203, 9°52.7' S, 139°02.2' W, 60-61 m, MNHN, 7.3 mm.

123. *Pascula* sp. BENTHAUS, Austral Archipelago, Rurutu Avera, stn DW 1995, 22°28.96' S, 151°21.85' W, 212-450 m, MNHN, 20.2 mm.

124-127. *Drupella eburnea* (Küster, 1862)

124. Society Islands, Moorea Id, NE of entrance to Opunohu Bay, off People's Beach, 17°49.15' S, 149°85.02' W, 1-3 m, FMNH 400709, 24.5 mm; **125-126.** Tahiti, lagoon, on coral, JT, 30.2 mm; 127. Tahiti, Faaone, Reef, on coral, JT, 39 mm.

128-129. *Drupella cornus* (Röding, 1798). French Polynesia, Tahiti, lagoon, on coral, JT, 27.7 mm.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We think it is useful to illustrate a SEM of the radula because in the Cernohorsky, 1980 drawing, there is no trace of any lateral denticle or of marginal folds, whereas they are clearly present in the radula illustrated here (Figs 18-19). The rachidian bears a moderately long, triangular central cusp with a broad base and on each side a short lateral denticle attached to a broad, short, lateral cusp, followed by 2 or 3 small marginal folds and a short marginal denticle. The lateral tooth is sickle-shaped and broad. The radula is atypical for *Pascula* [type species *Pascula citrica* (Dall, 1908)] from Easter Island, which has a radula with a long central cusp and on each side, a short, narrow lateral denticle, clearly separated from the long, broad, lateral cusp (Rehder, 1980: 135, figs 3-4). There is no trace of either marginal folds or of denticles.

The operculum of ?*P. ozenneana* is typical ergalataxine with a narrow outline and a subterminal nucleus (Fig. 10) and the radula is more akin to *Orania* Pallary, 1900 [type species *Orania fusulus* (Brocchi, 1814) from the Mediterranean] (Houart, 2001: 23, fig. 16), however the lateral denticle is not attached to the lateral cusp and the shell of *P. ozenneana* doesn't match the description of typical *Orania*. The species was transferred to *Pascula* by Tröndlé & Houart (1992) because it closely resembles other Indo-Pacific species such as *P. muricata* (Reeve, 1846) or *P. ochrostoma* (Blainville, 1832), however both of those have a typical *Pascula* radula. It is here tentatively retained in *Pascula* awaiting more information about radulae from related taxa.

Pascula sp.

Fig. 123

Material examined. BENTHAUS, Austral Archipelago, Rurutu Avera, stn DW 1985, 23°26.35' S, 150°44.22' W, 100-107 m, 1 dd, stn DW 1995, 22°28.96' S, 151°21.85' W, 212-450 m, 1 dd.

Remarks. There are only two specimens known of this species, one of which is badly damaged. Both were dead-collected and lack the protoconch. Although differing by having a more spinose and lighter shell with less spiral sculpture and straighter columella, the shell is reminiscent of *Pascula muricata* (Reeve, 1845), a common Indo-West Pacific species also found in French Polynesia. More fresh material is needed for a better comparison.

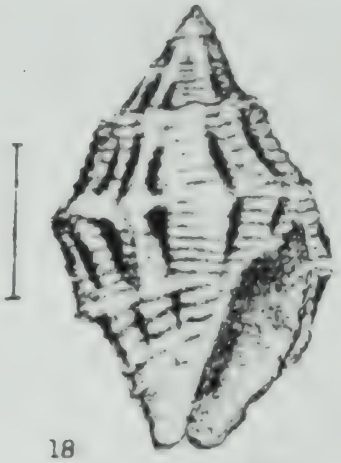
Usilla avenacea (Lesson, 1842)

Figs 11, 17

Purpura avenacea Lesson, 1842: 186.

Remarks. The radula was illustrated by Fujioka (1985: pl. 5, figs 45-46) but we think it is of interest to illustrate it again within the scope of this paper, since *Usilla avenacea* was described from Gambier, in French Polynesia.

The radula is clearly ergalataxine, very akin to *Cytharomorula* and *Pascula* (Houart, 1995), with a rachidian bearing a long, narrow central cusp, and on each side, a small lateral denticle, and a long lateral cusp slightly curved outwardly. There are no folds on the marginal area in the examined specimen.



130

130. *Engina striata* Pease, 1868.
From Pease (1868: pl. 23, fig. 18)

Subfamily Rapaninae Gray, 1853

Drupella eburnea (Küster, 1862)

Figs 124-127, 131

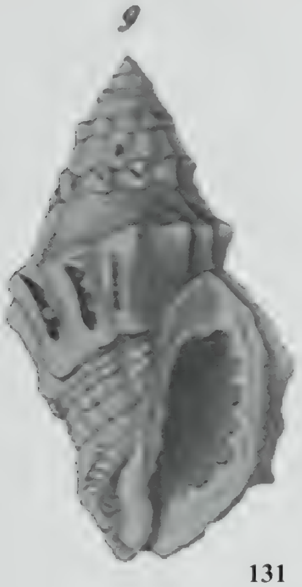
Ricinula eburnea Küster, 1862: 17, pl. 3, fig. 9.

Material examined. Society Islands, Moorea Is., NE of entrance to Opunohu Bay, off People's Beach,

17°49.15' S, 149°85.02' W, 1-3 m, 3 lv. FMNH 400709; Tahiti Is., lagoon, on coral, 10 lv & dd, JT; Tahiti Is., Faaone, reef, in coral, 2 dd, JT; Tahiti Is., Toahotu, reef flat, under coral, 1 lv, RH; Tahiti Is., Papara, reef flat Marae, under stones, 2 lv., JT; Tuamotus, Takapoto, 2 lv., 1 dd, JT; Kaukura, beach, 1 dd, JT.

Distribution. Maldives (RH), Vietnam (RH), Philippines (RH), Japan, Ryukyu Islands (Fujioka, 1982, 1984), New Caledonia (MNHN), Heron Island, Central Queensland, Australia (Fellegara, 1996) and Society Archipelago, French Polynesia.

Remarks. *Drupella eburnea* was illustrated by Fujioka (1982, 1984) and Fellegara (1996). It is distinguished from the related and much more common *D. cornus* (Röding, 1798) by having 2 or rarely 3 rows of strong spiral cords followed by 2 weaker ones adapically [P1-P2, P3, P4, P5 or (P1-P2), P3, P4, P5] on the last teleoconch whorl instead of 4 strong cords (P1-P4) in *D. cornus*. Already in juveniles consisting of 5 or 6 teleoconch whorls, the last whorl bears P1 and P2 very close to each other or even completely fused, followed by P3 and shallow P4 and P5. Adults also bear P1 and P2 fused or P1 immediately followed by a reduced P2, then P3 of the same strength as P1, followed by small, shallow P4 and P5. In adults of *Drupella cornus* (Figs 128-129) P1, P2 and P3 are of similar strength, followed by a weakly shallower P4. All 4 cords are equally separated in *D. cornus*.



131

131. *Ricinula eburnea* Küster, 1862.
From Küster (1862: pl. 3, fig. 9)

Subfamily Trophoninae Cossmann, 1903

Remarks. One new species is described: *Pagodula atanua* n.sp. from the Marquesas Islands. New material was also useful to definitively identify the species listed as *Trophon* sp. by Tröndlé & Houart (1992: 114).

Pagodula pulchella (Schepman, 1911)

Figs 132-133

Trophon pulchellus Schepman, 1911: 339, pl.21, fig. 2.
?*Trophon johannthielei* Barnard, 1959: 206, fig. 44b.
Trophon sp. – Tröndlé & Houart, 1992: 114, fig. 102.

Material examined. MUSORSTOM 9. Marquesas, stn CP 1270, 7°56.00' S, 140°43.2' W, 497-508 m, 1 lv. BENTHAUS, Austral Archipelago, stn DW 1863, 27°39.14' S, 144°15.83' W, 650-684 m, 1 dd, stn DW 1889, 27°36.87' S, 144°15.75' W, 600-620 m, 7 lv & dd, stn DW 1890, 27°38.9' S, 144°15.64', 800-822 m, 1 dd, stn CP 1891, 27°37.09' S, 144°15.42' W, 800-850 m, 1 dd, stn CP 1909, 27°38.63' S, 144°14.61' W, 783-1000 m, 1 lv, stn 1923, 27°01.29' S, 146°05.29' W, 360-840 m, 1 lv.

Distribution. *Pagodula pulchella* was described from the Halmahera Sea, 0°59.1' S, 129°48' E, in 411 m. Its discovery in the Austral Islands results in a major range extension. However its full range is certainly wider, because very similar specimens collected recently off Mozambique, Závara/Bazaruto, trawled alive in 420-460 m (RH and Rosado coll.) reinforce the possibility that *Trophon johannthielei* Barnard, 1959, described from South Africa is most probably conspecific.

Pagodula atanua n. sp.

Figs 16, 134-139

Type material. MUSORSTOM 9, French Polynesia, Marquesas, Nuku Hiva, stn CP 1307, 8°57.9' S, 140°15.8' W, 708-738 m, lv., holotype MNHN 20180.

Other material examined. MUSORSTOM 9, Marquesas, stn CP 1302, 8°56.7' S, 140°15.3" W, 478-502 m, 1 dd, stn DR 1255, 9°38.5' S, 139°48.4' W, 416-440 m, 1 dd, stn DW 1281, 7°47.8' S, 140°20.8' W, 450-455 m, 7 lv & dd.

Type locality. French Polynesia, Marquesas, Nuku Hiva, 8°57.9' S, 140°15.8' W, 708-738 m.

Distribution. French Polynesia, Marquesas, Dumont D'Urville, Motu One Hatutaa and Nuku Hiva, living at 455-708 m.

Description of the holotype. Shell medium sized for the genus, 26.6 mm in length, broadly ovate, heavy. Shoulder weakly sloping, weakly concave. Grayish-white, covered by light tan chalky layer (intritacalx?). Aperture flesh-colored.

Spire high. Protoconch and first 2 teleoconch whorls eroded. Remainder of teleoconch consisting of 4 broadly convex, weakly shouldered whorls. Suture weakly adpressed.

Axial sculpture of teleoconch whorls consisting of low, broad, lamellose ribs. Last whorl with 9 ribs, penultimate with 10. Axial and spiral sculpture of previous whorls strongly eroded. Spiral sculpture of very low, weak, broad, primary cords, of which only P1, P2 and P3 weakly discernible.

Aperture narrow, high, ovate; columellar lip narrow, elongate, smooth. Rim completely adherent. Anal notch shallow, broad. Outer lip smooth, thick with elongate, broad crest within, with 2 broad, very low denticles, probably D1-D2 fused and D3-D4 fused. Siphonal canal moderately long, broad, straight, broadly open.

Operculum light brown, narrowly ovate, with apical nucleus and numerous concentric ridges. Attachment surface with broad, callused rim. Radula (Fig. 16) with a rachidian bearing a broad, long, triangular central cusp, a small, narrow, lateral denticle and a broad, long, triangular lateral cusp.

Remarks. The additional material examined consists of a crabbed and damaged large adult specimen and 8 juveniles. The adult specimen (Figs 138-139) is slightly more strongly shouldered than the holotype, and has 4 very low, weak denticles within the aperture, barely visible on the photograph. The last whorl of the two largest juvenile specimens (Figs 136-137) fits perfectly with the antepenultimate whorl of the adult specimens, which bear 10-12 axial lamellae. However it is not certain whether these juvenile specimens are conspecific with *P. atanua* or whether they belong to another related unnamed species. The juveniles have 1.5 small, rounded, teleoconch whorls, and 3 or 4 teleoconch whorls with 10-12 axial lamellae on the last whorl.

Pagodula obtuselirata (Schepman, 1911), described from the Flores Sea and known from a few scattered localities in the Indo-West Pacific to the Fiji Islands (MNHN), differs in having a thinner shell with more strongly shouldered penultimate and last teleoconch whorls, a higher, more acute spire, a more triangular-shaped last teleoconch whorl and aperture, a higher, more obvious P1, a narrower siphonal canal and more numerous axial lamellae on the last teleoconch whorl (10-13 *vs.* 9 in *P. atea* n.sp.).

Pagodula tenuirostrata (Smith, 1899) from the Andaman Islands also has a much more thinner shell with a higher spire, broader and more sloping shoulder, and a relatively longer, narrower, siphonal canal.

The presumed juveniles of *P. atenua* n.sp. resemble somewhat the Japanese *Trophonopsis polycyma* Kuroda, 1953, or the related *T. kayae* Habe, 1981 from Hawaii. However, the juveniles have a thin fragile shell with a thin apertural lip, compared to the thick shell of both Japanese and Hawaiian species, which also have a broad apertural lip with obvious denticles within. Both species also have more numerous axial lamellae and more numerous, higher and more obvious spiral cords.

Etymology. In the mythology of the Marquesas Islands, Atanua is the dawn goddess, wife of Atea.

Subfamily Typhinae Cossmann, 1903

Remarks. The subfamily Typhinae had not been found before in French Polynesia.

Monstrotyphis singularis Houart, 2002

Figs 140-145

Monstrotyphis singularis Houart, 2002b: 150, figs 3, 4-6, 10-13.

Material examined. Atelier RAPA 2002, stn 8, 27°36.5' S, 144°17.7' W, 52-57 m, 7 lv & dd; stn 44, 27°36.3' S, 144°18.2' W, 30 m, 8 lv & dd.

Distribution. Described from New Caledonia, this species was known to date only from the type material.

Remarks. We were not able to separate the new material from the species described from New Caledonia. Notwithstanding the protoconch consisting of 1.5 rounded whorls, which indicates lecithotrophic larval development, this species has jumped a gap of almost 5000 km to reach the Austral Archipelago. It would thus not be surprising to find *M. singularis* in other parts of the Pacific Ocean.

Questionable subfamily

Remarks. There are currently several genera that do not fit properly into any of the existing subfamilies because of their peculiar morphology of shell, radula and/or operculum. They are, in alphabetical order: *Daphnellopsis* Schepman, 1913, *Galfridus* Iredale, 1924, *Lindapterys* Petuch, 1987, *Maculotriton* Dall, 1904, *Phrygiomurex* Dall, 1904, *Phyllocoma* Tapparone Canefri, 1881, *Pradoxa* Fernandes & Rolán, 1990, *Uttleya* Marwick, 1934 and *Vexilla* Swainson, 1840. Four of those, *Maculotriton, Phrygiomurex, Phyllocoma* and *Vexilla* occur in French Polynesia.

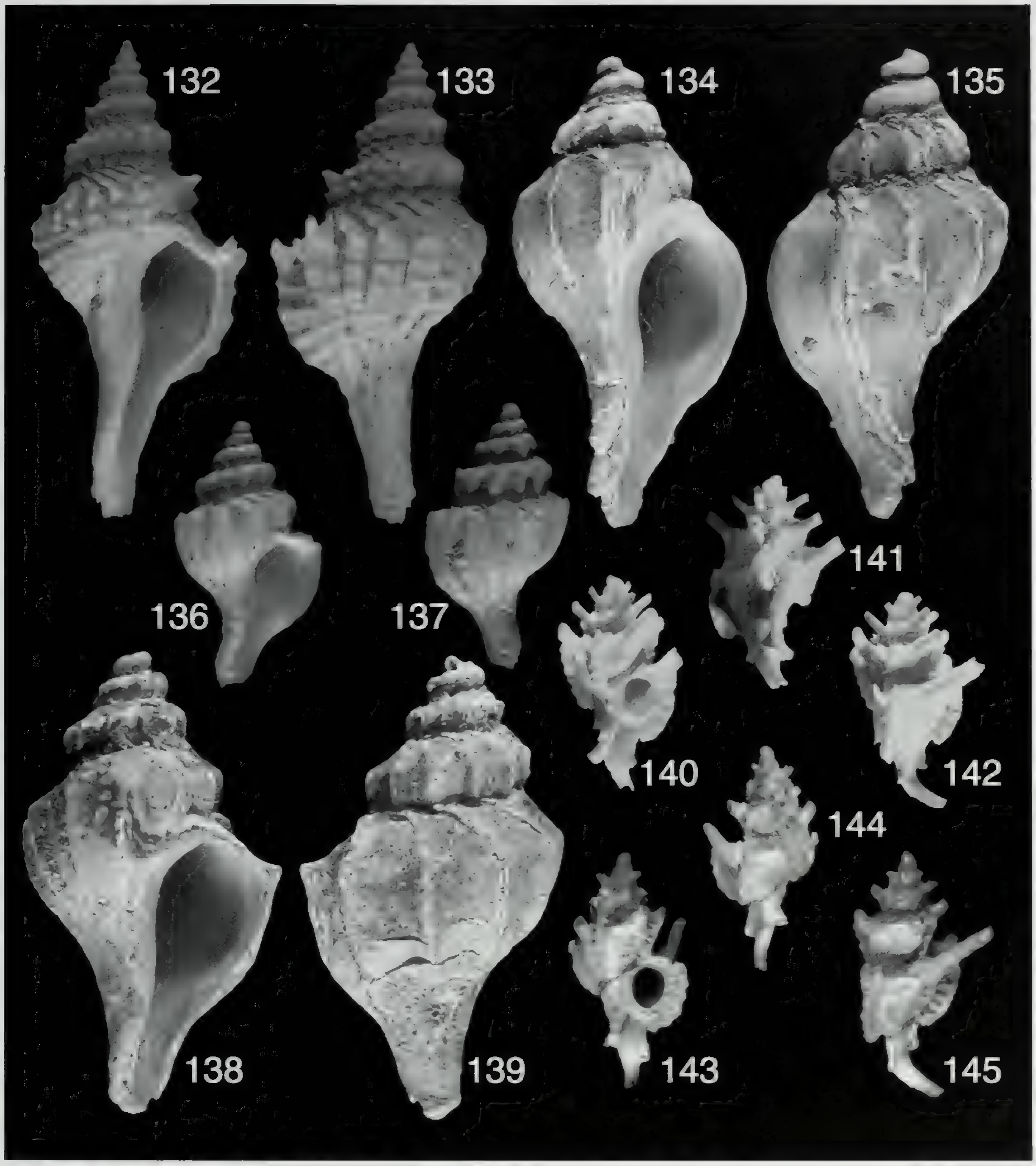
Maculotriton serriale (Deshayes, 1834)

Buccinum serriale Deshayes (1834) in Laborde, 1830-1834: 66, figs 32-34.

Maculotriton serriale (Deshayes, 1830) – Tröndlé & Houart, 1992: 90.

Additional note. *Maculotriton serriale* was assigned to Deshayes (1830) by Sherborn. However, although the title page is dated 1830, the plates are all dated 1833 (B. Métivier, in litt.). However, Tomlin & Salisbury (1928) noted: "The plates and maps are bound at the end of the volume, none of these being numbered; but two of the latter bear dates 1833 and 1834, so that the book could not have been published prior to this last date, in spite of the date on the title page, which is given as 1830". On the other hand, that taxon was published in Laborde (1830-1834) and not in Laborde & Linant as listed in Cernohorsky (1982).

M. serriale has a very variable shell morphology. Some shells are white or with some brown nodes on the periphery, with a darker band around the nodes. Another band of darker nodes is situated just above the siphonal canal and on the shoulder, near the suture. Some also have narrower and weaker spiral cords. However these differences are not constant and there are many intermediate forms in sculpture morphology and/or color. Some have broader cords without or almost without secondary cords; the shell is occasionally broader, darker colored, or broad and white, but without consistency. All these varieties exist in French Polynesia. Attempts to separate them into



Figures 132-145

132-133. *Pagodula pulchella* (Schepman, 1911). BENTHAUS, Austral Archipelago, stn CP 1909, 27°38.63' S, 144°14.61' W, 783-1000 m, MHNH, 30.5 mm.
134-139. *Pagodula atanua* Houart & Tröndlé n. sp.
134-135. Holotype MNHN 20180, 26.7 mm; 136-137. MUSORSTOM 9, stn DW 1281, 7°47.8' S, 140°20.8' W, 450-455 m, MNHN, 7.9 mm; 138-139. MUSORSTOM 9, Marquesas, stn CP 1302, 8°56.7' S, 140°15.3" W, 478-502 m, 1 dd, stn DR 1255, 9°38.5' S, 139°48.4' W, 416-440 m, MNHN, 23.7 mm.
140-145. *Monstrotyphis singularis* Houart, 2002
140-142. Austral Archipelago, Rapa, NW of Tauna Id, 27°36.3' S, 144°18.2' W, 30 m, MNHN, 5.7 mm; 143-145. Holotype MNHN 0293, New Caledonia, chenal de Touho, 6.3 mm (photo MNHN).

different groups always fail when more material from other parts of the world are examined and compared. We therefore consider all these forms to be probably conspecific.

***Vexilla taeniata* (Powis, 1835)**

Fig. 110

Purpura taeniata Powis, 1835: 96.
Vexilla vexillum – Salvat & Rives, 1975: 317, fig. 218; 1984: 98, fig. 4 [not *Vexilla vexillum* (Gmelin, 1791)].

Material examined. Tuamotus, Fakarava, on the beach, 1 dd, JT; Takapoto Nord, outer reef flat, under coral, 2 lv., JT; Rangiroa, 10-15 m, under coral, 1 lv, RH.

Distribution. Mauritius, Central Java, Tuamotus

Remarks. *Vexilla taeniata* was considered a synonym of *V. vexillum* (Gmelin, 1791) by Tröndlé & Houart (1992: 114), however, *V. taeniata* differs in having a more conical shell instead of weakly convex in *V. vexillum*, and in having a narrower aperture, a straighter columellar lip with a more obvious parietal tooth, a deeper anal sulcus, and more numerous denticles within the outer apertural lip.

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TABLES 3-10

bold : new record
+ : in Tröndlé & Houart (1992) or Houart & Tröndlé (1997)
◆ : new locality
● : endemic

Expeditions.
1. MUSORSTOM 9 -August 1997-
2. coll. Von Cosel, Tröndlé & Tandy -September 1997-
3. BENTHAUS -November 2002-
4. Rapa 2002

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
Chicoreus (C.) ramosus (Linnaeus, 1758)	+	+	+	+	+		1	
Chicoreus (Triplex) maurus (Broderip, 1833)	+	+	+				1, 2	
Chicoreus (Triplex) rubescens (Broderip, 1833)	+	+	+					
Chicoreus (Triplex) strigatus (Reeve, 1849)	+	+						
Chicoreus (Triplex) thomasi (Crosse, 1872)			+				1	●
***Chicoreus (Triplex) torrefactus* (Sowerby, 1841)**	◆							
Chicoreus (Chicopinnatus) laqueatus (Sowerby, 1841a)	+	+						
Chicoreus (Chicopinnatus) orchidiflorus (Shikama, 1973)					+			
***Naquetia barclayi* (Reeve, 1858)**			◆				1	
Naquetia cumingii (A. Adams, 1853)	+	+		+				
Naquetia triqueter (Born, 1778)	+	+		+				
Chicomurex laciniatus (Sowerby, 1841)	+							
Chicomurex venustulus (Rehder & Wilson, 1975)			+				1	
Homalocantha anatomica (Perry, 1811)	+		+				1	
***Poirieria (Paziella) tanaoa* n. sp.**			◆				1	●
Pterynotus elongatus (Lightfoot, 1786)	+	+						
Pterynotus loebbeckei (Kobelt, 1879)				+	◆		3	
***Pterymarchia aparrii* (D'Attilio & Bertsch, 1980)**						◆	3	
Pterymarchia bouteti (Houart, 1990)	+	+	+					●
Pterymarchia martinetana (Röding, 1798)	+	+						
Pterymarchia triptera (Born, 1778)	+		+					
***Aspella lozoueti* n. sp.**						◆	4	●
***Aspella hildrunae* n. sp.** as *Aspella platylaevis* Radwin & D'attilio, 1976 in Tröndlé & Houart (1992)	+	+	◆	◆		+		●
***Aspella helenae* n. sp.**	◆							●
Aspella producta (Pease, 1861)	+	◆	+				1, 2	
Dermomurex (Trialatella) trondleorum Houart, 1990		+						●
***Dermomurex (Takia) infrons* Vokes, 1974**					◆		1	
Attiliosa caledonica (Jousseaume, 1881)	+	+						

Table 3. Distribution of Muricidae in French Polynesia (Muricinae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
Favartia (Favartia) brevicula (Sowerby, 1834)					+			
***Favartia (Favartia) conleyi* Houart, 1999** (March) [= *Favartia (Murexiella) lillouxi* Myers & Hertz, 1999] (April)	◆		◆					
Favartia (Favartia) guamensis Emerson & D'Attilio, 1979 as *Favartia (Favartia) crouchi* (Sowerby, 1894) in Tröndlé & Houart (1992)	+	+						
***Favartia (Favartia) maculata* (Reeve, 1845)**			◆		◆		1, 3	
Favartia (Favartia) ponderi Myers & D'Attilio, 1989	+	◆						
Favrtia rosamiae D'Attilio & Myers, 1985			+					
***Favartia (Favartia)* sp. cf. *F. sykesi* (Preston, 1904)**			◆				1, 2	●
Favartia (Favartia) tetragona (Broderip, 1833)	+							
***Favartia (Favartia)* sp.**			◆				1	●
***Favartia (Favartia) salvati* n. sp.**			◆		◆		3	●
***Favartia (Favartia) nivea* n. sp.**					◆		3	●
***Favartia (Pygmaepterys) avatea* n.sp.**					◆		3	
***Favartia (Pygmaepterys)* sp. 1**					◆		3	●
***Favartia (Pygmaepterys)* sp .2**					◆		3	●
***Murexsul tokubeii* Nakamigawa & Habe, 1964**					◆	◆	3	

Table 4. Distribution of Muricidae in French Polynesia (Muricopsinae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
Ergalatax contracta (Reeve, 1846)		+						
Ergalatax margariticola (Broderip, 1833)	+	+		+	+	◆		
***Cytharomorula ambonensis* (Houart, 1996)**			◆				1	
***Cytharomorula danigoi* Houart, 1995**						◆	3	
Cytharomorula grayi (Dall, 1889)			+				1	
Cytharomorula lefevreiana (Tapparone Canefri, 1880)	◆	+						
***Cytharomorula paucimaculata* (Sowerby, 1903)**	◆	◆	◆		◆	◆	1, 3	
***Cytharomorula springsteeni* Houart, 1995**					◆		3	
***Morula (Morula) anaxares* (Kiener, 1835)**	◆							
Morula (Morula) angulata (Sowerby, 1893)	+	+						
Morula (Morula) cernohorskyi Houart & Tröndle, 1997		+			◆		3	●
Morula (Morula) echinata (Reeve, 1846)	+	+	◆	◆			1	
Morula (Morula) granulata (Duclos, 1832)	+	+	+	+	+	+	1, 2, 4	
Morula (Morula) nodicostata (Pease, 1868) = *Morula parvissima* Cernohorsky, 1987	+	+		◆				●
Morula (Morula) oparense (Melvill, 1912)		+			◆	+	3, 4	●
***Morula (Morula) peasei* Houart, 2002** [as *Morula nodicostata* (in part) in Tröndlé & Houart, 1992]	◆	◆		◆	◆	◆	4	●
***Morula (Morula) rodgersi* Houart, 2000**	◆							
Morula (Morula) uva (Röding, 1798)	+	+	+	+	+	+	2, 4	
Morula (*Morula*) variabilis (Pease, 1868) [as *Morula nodicostata* (in part) in Tröndlé & Houart, 1992]		+			+			●
Morula (Morula) zebrina Houart, 2004 (new name for *Sistrum striatum* Pease, 1868, not *Engina striata* Pease, 1868)	+	+			+	◆	4	●
***Morula (Habromorula) ambrosia* (Houart, 1995)**	◆	◆				◆	3, 4	
Morula (Habromorula) bicatenata (Reeve, 1846)	+	◆						
***Morula (Habromorula) dichrous* (Tapparone Canefri, 1880)**	◆							
Morula (Habromorula) porphyrostoma (Reeve, 1846)		+	+				1	
Morula (Habromorula) spinosa (H. & A. Adams, 1853)	+							
Morula (Habromorula) striata (Pease, 1868)		?						
Muricodrupa fenestrata (Blainville, 1832)	+	+		+	+			
***Muricodrupa fiscella* (Gmelin, 1791)**			◆				1, 2	
***Orania archaea* Houart, 1995**			◆				1	
***Orania maestratii* n. sp.**					◆	◆	3	●
Orania pacifica (Nakayama, 1988)		non	+				1	
Orania simonetae Houart, 1995 (as *Pascula benedicta* in Tröndle & Houart, 1992)	+	◆	+		◆		3	●
***Orania atea* n. sp.**			◆				1	●
Pascula citrica (Dall, 1908)	+	+			+	+	3	
***Pascula darrosensis* (E.A. Smith, 1884)**			◆				1, 2	
Pascula muricata (Reeve, 1846) [as *Pascula* sp. in Tröndlé & Houart, 1992)]	+	+	+	+		+	1, 2	
Pascula ozenneana (Crosse, 1861)	◆		+				1, 2	
Pascula submissus (E. A. Smith, 1903)			+				1, 2	
***Pascula* sp.**					◆		3	
Spinidrupa euracantha (A. Adams, 1853)	+	+	+					
Usilla avenacea (Lesson, 1842)		+	+	+			2	

Table 5. Distribution of Muricidae in French Polynesia (Ergalataxinae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
***Pagodula pulchella* (Schepman, 1911)** (= *Trophon* sp. in Tröndlé & Houart, 1992)					◆	+	3	
***Pagodula atanua* n. sp.**			◆				1	●

Table 6. Distribution of Muricidae in French Polynesia (Trophoninae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
Tripterotyphis lowei colemani Ponder, 1972		+						

Table 7. Distribution of Muricidae in French Polynesia (Tripterotyphinae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
***Monstrotyphis singularis* Houart, 2002**						◆	3	

Table 8. Distribution of Muricidae in French Polynesia (Typhinae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
Drupa (Drupa) elegans (Broderip & Sowerby, 1829)	+	+	+					●
Drupa (Drupa) morum morum Röding, 1798	+	+		+	+	+	4	
Drupa (Drupa) morum iodostoma (Lesson, 1840)			+				2	●
Drupa (Drupa) ricinus (Linnaeus, 1758)	+	+	+	+	+	+	2, 4	
Drupa (Ricinella) clathrata (Lamarck, 1816)	+	+	+	+	+		2	
Drupa (Ricinella) rubusidaeus Röding, 1798	+	+	+	+	+		3	
Drupa (Ricinella) speciosa (Dunker, 1867)	+	+	+	+			1	
Drupa (Drupina) grossularia Röding, 1798	+	+	+	+	+	◆	3, 4	
Drupella cornus Röding, 1798)	+	+	+	+	+	◆	3, 4	
***Drupella eburnea* (Küster, 1862)**	◆	◆						
Drupella fragum (Blainville, 1832)	+	+	◆	+				
Drupella rugosa (Born, 1778)	+	+		+				
Nassa serta (Bruguière, 1789) [as *Nassa francolina* (in part) in Tröndle & Houart, 1992)]					+			
Nassa tuamotuensis Houart, 1996	+	+	◆	+		+	2	●
Neothais nesiotes (Dall, 1908)				+	◆	+	3, 4	
Purpura persica (Linnaeus, 1758)		+	+	+			2	
Reishia armigera (Link, 1807)	+	+	+	+	+		2	
Semiricinula marginatra (Blainville, 1832)	+		+				2	
Semiricinula muricoides (Blainville, 1832) (as *Thais infumata*, a synonym, in Tröndle & Houart, 1992)	+							
Semiricinula turbinoides (Blainville, 1832) (as *Thais foliacea*, a synonym, in Tröndle & Houart, 1992)	+		+				1, 2	
Thais (Thalessa) aculeata (Deshayes & Milne Edwards, 1844)	+	+	+	+				
Thais (Thalessa) intermedia (Kiener, 1835)	+	+		+		+	4	
Thais (Thalessa) tuberosa (Röding, 1798)	+	+	+	+		+		

Table 9. Distribution of Muricidae in French Polynesia (Rapaninae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
Maculotriton serriale (Deshayes, 1833)	+	+	+	+	+	◆	2, 4	
Phrygiomurex sculptilis (Reeve, 1844)	+	+	◆					
Phyllocoma convoluta (Broderip, 1833)	+	+	+				1, 2	
Vexilla vexillum (Gmelin, 1791)		+	+					
***Vexilla taeniata* (Powis, 1835)**		◆						

Table 10. Distribution of Muricidae in French Polynesia (subfamily questionable)

A new *Chryseofusus* (Gastropoda: Fasciolariidae: *Fusinus*) from South and Western Australia

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KEYWORDS. Mollusca, Gastropoda, Fasciolariidae, *Fusinus*, *Chryseofusus*, South Australia, Western Australia, Great Australian Bight, new species.

A new *Fusinus* (*Chryseofusus*) is described from South and Western Australia and compared to *F. (C.) graciliformis* (Sowerby, 1880), *F. (C.) jurgeni* Hadorn & Fraussen, 2002, *F. (C.) artutus* Hadorn & Fraussen, 2003 and the endemic Australian *F. (C.) westralis* Hadorn & Fraussen, 2003. This new finding extends the range of *Chryseofusus* to South Australia (Great Australian Bight).

INTRODUCTION

A new *Chryseofusus* species was brought to our attention by Mrs. Alison Miller from the Australian Museum in Sydney. The two specimens which are stored in the mollusc collection of the Australian Museum, Sydney, were collected almost hundred years ago by the Fisheries Investigation Ship 'Endeavour' in the deeper waters of the Great Australian Bight. Dr. W.F. Ponder examined these specimens in 1972 and recognized them as a new species in *Fusinus*, but they have remain undescribed.

An additional third sample with 4 specimens was collected 20 years ago by commercial shrimp vessels near Rowley Shoals, Western Australia.

Hadorn & Fraussen (2003) established the subgenus *Chryseofusus* in *Fusinus* to accommodate a number of deep water species sharing conchological characteristics different from typical *Fusinus*, and Hadorn & Chino (2005) and Hadorn & Fraussen (2006) described new *Chryseofusus* species from Japan and from southwest Pacific. The present species from the Great Australian Bight and Western Australia is another addition to this group.

Chryseofusus is ecologically a deep water group, accomodating species from the Indo-Pacific upper bathyal zone, between 100 and 1900 m deep.

Abbreviations

AMS: Australian Museum, Sydney, Australia
ANSP: Academy of Natural Sciences of Philadelphia, Pennsylvania, USA
BMNH: The Natural History Museum, London, Great Britain
CRH: Collection Roland Hadorn, Röthenbach, Switzerland
MNHN: Muséum national d'Histoire naturelle, Paris, France
NM: Natal Museum, Pietermaritzburg, South Africa
WAM: Western Australian Museum, Perth, Australia

SYSTEMATICS

Family **FASCIOLARIIDAE** Gray, 1853

Genus ***Fusinus*** Rafinesque, 1815

Fusinus Rafinesque, 1815: 145. Substitute name for '*Fusus* Lamarck 1799' [=*Fusus* Bruguière, 1789], non *Fusus* Helbling, 1779.

Type species. *Murex colus* Linnaeus, 1758, by typification of replaced name.

Subgenus ***Chryseofusus*** Hadorn & Fraussen, 2003
Chryseofusus Hadorn & Fraussen, 2003: 207-240.

Type species. *Fusus chrysodomoides* Schepman, 1911, by original designation.

Fusinus (Chryseofusus) alisonae sp. nov.

Figs 1-11

Type material. Holotype (69.2 x 26.1 mm) AMS C.50986, South Australia, Great Australian Bight, south of Head of Bight, 33°25' S, 131°00' E, 366 m deep, collected alive by the Fisheries Investigation Ship 'Endeavour' (May 05, 1913); paratype 1 (61.9 x 24.9 mm) AMS C.89589, same locality.

Paratype 2 (51.2 x 19.3 mm) ANSP 416380, Western Australia, near Rowley Shoals, 380-450 m deep, trawled by shrimp vessels (1987); paratype 3 (50.3 x 19.6 mm) ANSP 416380, same locality; paratype 4 (46.2 x 19.9 mm) CRH, same locality; paratype 5 (43.0 x 17.2 mm) ANSP 416380, same locality.

Type locality. South Australia, Great Australian Bight, south of Head of Bight, 33°25' S, 131°00' E.

Etymology. *Fusinus (Chryseofusus) alisonae* sp. nov. is named to honour Mrs. Alison Miller, Technical Officer at the Malacology Section of the Australian Museum in Sydney.

Description. Shell of medium size (to about 70 mm), fusiform, consisting of about 9 slightly bicarinated postnuclear whorls, giving the shell a moderately bicarinate profile with a slight subsutural concavity. Double keel more pronounced on upper whorls, situated slightly below middle of whorls, shoulder slope concave.

Colour off-white, occasionally with reddish-brown tinged apex and/or tip of siphonal canal. Occasionally with red-brown tinged spiral cords on body whorl and along suture.

Suture distinct, slightly wavy, following axial sculpture of preceding whorl on spire whorls, straight on body whorl.

Protoconch decollate in all available specimens. Two specimens show a partly preserved white, glossy, smooth last protoconch whorl with some weak axial riblets near transition to teleoconch. Transition to teleoconch marked by weak varix. Diameter: 0.9-1.0 mm.

Axial ribs rather inconspicuous, broad, low, with narrow interspaces. 8-10 on 4 upper postnuclear whorls, running from suture to suture. 8-12 axial ribs on following whorls, starting below the suture in the subsutural concavity. Axial sculpture suddenly irregular, weak and low from penultimate whorl on, numbering about 10-15 often indistinct axial ribs, occasionally evanescent on body whorl.

Teleoconch beginning with 4 primary spiral cords, abapical ones stronger. 5 primary spiral cords on second whorl. From second or third whorl on, an intercalated secondary spiral cord appears between primary cords, occasionally becoming as strong as primary cords on latter whorls. From third whorl on, fine tertiary cords appear on both sides of stronger secondary cords. Number of tertiary cords on body whorl increasing to up to 6 by intercalation. Spiral sculpture crossed by conspicuously strong growth lines giving surface the texture of linen.

Aperture ovate, pinched at both ends, whitish or yellowish, smooth within. Outer lip simple. Parietal callus rather thick, smooth, appressed, lacking folds and teeth.

Siphonal canal open, slightly shorter than length of aperture, straight, slightly twisted and turned backwards at tip.

Operculum corneous, dark brown, shape and size corresponding to aperture, nucleus apical.

Radula (Fig. 7) typical of *Fusinus*. Central tooth round-ovate, tricuspid, cusps slighty projecting below slightly broader base. Lateral teeth curved with 8 strong pointed cusps with incurved tips.

Range and habitat. South Australia, Great Australian Bight, south of Head of Bight, and Western Australia, near Rowley Shoals. Live collected specimens 366 m deep, empty shells 380-450 m deep.

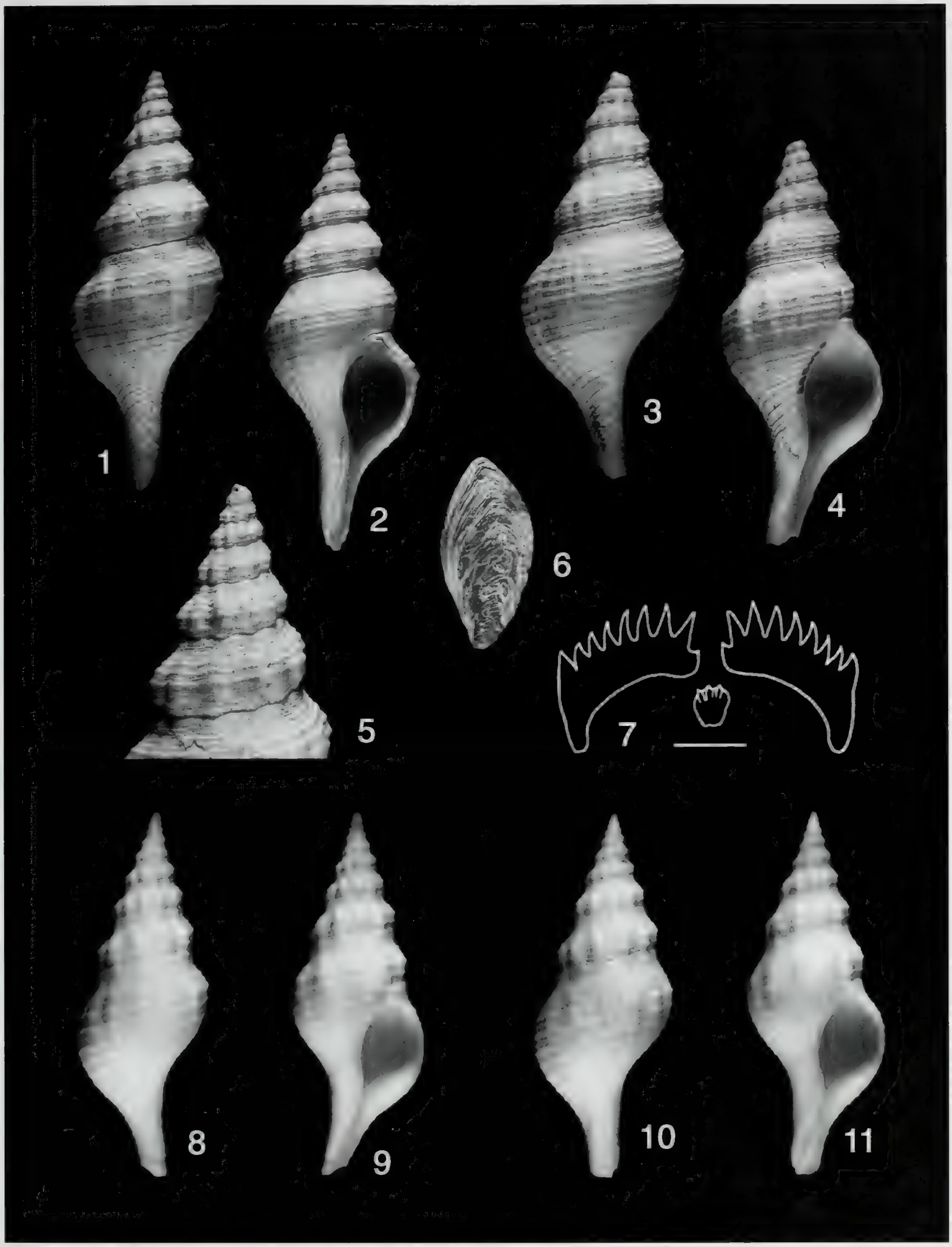
This new finding extends the geographical distribution of the subgenus *Chryseofusus* to South Australia (Great Australian Bight).

Discussion. *Fusinus alisonae* sp. nov. is placed in the subgenus *Chryseofusus* based on the smooth adapical whorls, the weak, close-set, inconspicuous, regular spiral sculpture crossed by distinct growth lines giving the surface the texture of linen, the relatively short spire and siphonal canal, the modestly convex whorls with subsutural concavity, and the simple, adherent parietal callus.

This new taxon has a geographic distribution different from all known *Chryseofusus* species. The only species known from Australian waters, *F. (C.) westralis* (Figs 18-19), which is endemic to northwestern Australia, differs in having a much larger size (up to 140 mm), a longer spire, a larger number of ventricose, non-carinated whorls, an almost obsolete axial sculpture and conspicuously fine spiral sculpture.

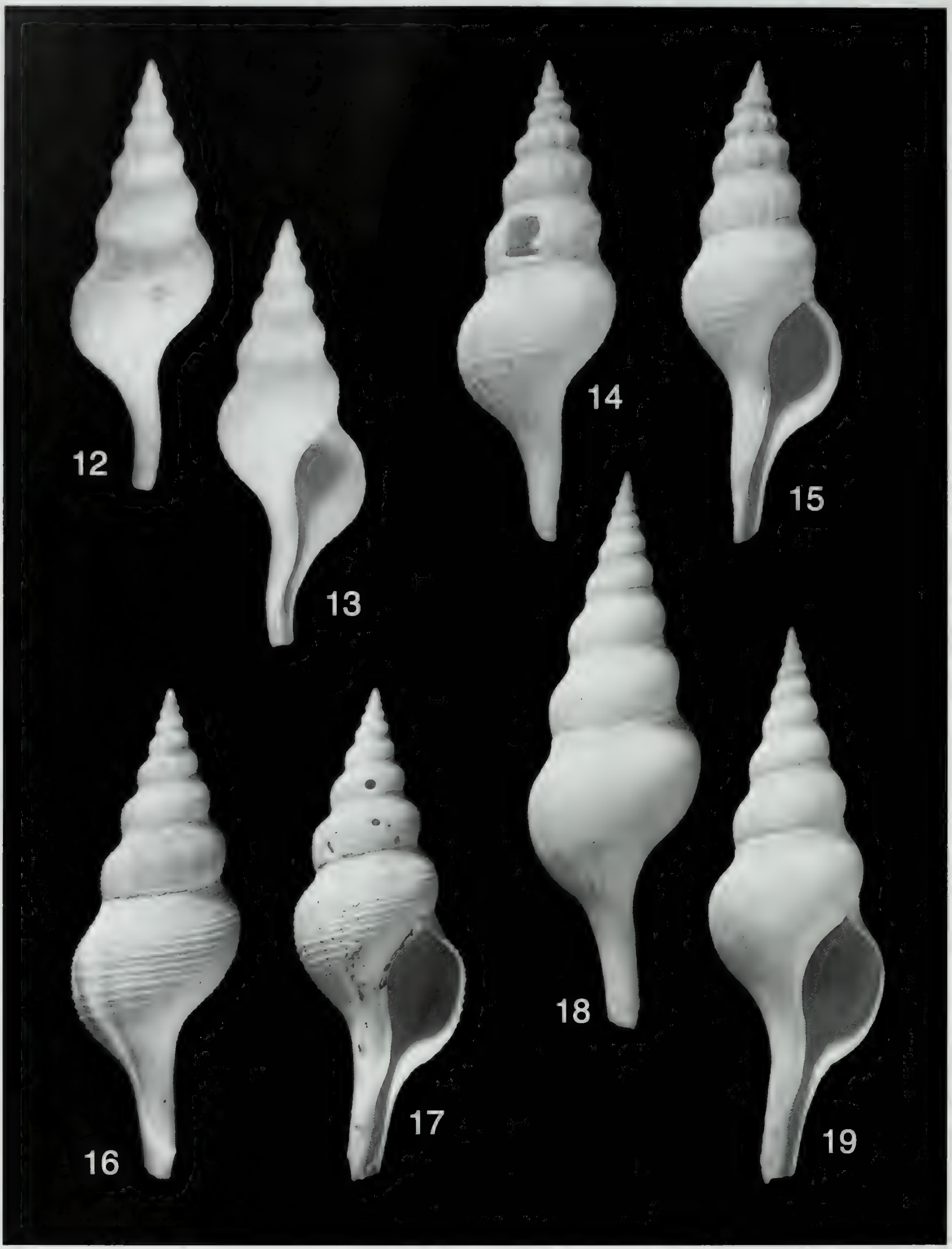
Fusinus (C.) alisonae sp. nov. differs from:

- *Fusinus (C.) graciliformis* (Sowerby, 1880) (Figs 12-13) from the Indo-West Pacific, in having a less prominent axial sculpture on upper whorls, usually obsolete axial ribs on penultimate and body whorl, convex and unkeeled whorls, and a more slender and twisted siphonal canal.
- *Fusinus (C.) jurgeni* Hadorn & Fraussen, 2002 (Figs 14-15) from the east African coast, in having a larger size (up to 100 mm), a larger number of whorls, usually weak or obsolete axial sculpture on penultimate and body whorl, and a comparatively longer siphonal canal.
- *Fusinus (C.) artutus* Hadorn & Fraussen, 2003 (Figs16-17) from the Philippine Islands, in having a flesh coloured to light brownish shell, more numerous, finer and narrower axial ribs on upper whorls, abruptly fading away on penultimate



Figures 1-11. ***Fusinus (Chryseofusus) alisonae*** **sp. nov.**

1-2. Holotype AMS C.50986, South Australia, Great Australian Bight, south of Head of Bight, 69.2 mm;
3-4. Paratype 1 AMS C.89589, South Australia, Great Australian Bight, south of Head of Bight, 61.9 mm;
5. Spire tip, holotype AMS C.50986; **6.** Operculum, paratype 1 AMS C.89589; **7.** Radula, paratype 1 AMS C.89589, scale bar = 100 μm; **8-9.** Paratype 2 ANSP 416380, Western Australia, near Rowley Shoals, 51.2 mm;
10-11. Paratype 3 ANSP 416380, Western Australia, near Rowley Shoals, 50.3 mm.



Figures 12-19.

12-13. *Fusinus (Chryseofusus) graciliformis* (Sowerby, 1880). Holotype BMNH 1880.10.15.2, Japan, 52.5 mm; **14-15.** *Fusinus (Chryseofusus) jurgeni* Hadorn and Fraussen, 2002. Holotype MNHN, southwest Madagascar, 94.2 mm; **16-17.** *Fusinus (Chryseofusus) artutus* Hadorn and Fraussen, 2003. Holotype NM L2083, Philippine Islands, Bohol, Panglao, 72.2 mm; **18-19.** *Fusinus (Chryseofusus) westralis* Hadorn and Fraussen, 2003. Holotype WAM S10876, northwest Australia, Rottnest Island, 114.4 mm.

whorl, and by the obsolete axial sculpture on the body whorl.

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Descriptions of sixteen new species of the genus *Gibberula* Swainson, 1840 (Gastropoda: Cystiscidae) from the Caribbean

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KEYWORDS. Cystiscidae, *Gibberula,* Caribbean, new species.

ABSTRACT. A list of described Caribbean species of the genus *Gibberula* is given, together with the recognised synonyms. Sixteen new species are described for the first time: *G. celerae* n. sp., *G. conejoensis* n. sp., *G. fortis* n. sp., *G. gradatim* n. sp., *G. granulinaformis* n. sp., *G. oriens* n. sp. and *G. vitium* n. sp. from Venezuela, *G. aperta* n. sp. and *G. jenphillipsi* n. sp. from Curaçao, Spaanse Water, *G. arubagrandis* n. sp., *G. velox* n. sp. from Aruba, *G. fortisminor* n. sp. and *G. quatrefortis* n. sp. from West Indies, St. Vincent & Grenadines, Isle Quatre, *G. occidentalis* n. sp. and *G. stella* n. sp. from Honduras, and *G. belizensis* n. sp. from Belize.

INTRODUCTION

The name Caribbean is used herein to include south eastern U.S.A. south of Georgia, and the Bahamas in the north, Trinidad and Tobago in the south east (see plate).

Preceding the year 2000 only five recognised Caribbean *Gibberula* species had been described. *G. lavalleeana* d'Orbigny, 1842, and *G. evadne* Dall & Simpson, 1901. Since then ten new species have been added to this number: Eight by Espinosa and Ortea (2000, 2006), one by Faber (2005), and one by Cossignani (2006). Faber renamed *G. minuta* Pfeiffer, 1840. Although sixteen new species are described herein, raising the number to twenty nine, it is probable that at least as many more remain to be discovered. Over the years many scientific expeditions have been carried out in the Caribbean, but most of the minute *Gibberula* species, being little bigger than a grain of sand, appear to have been overlooked.

During the years 1998, 1999, 2003 through 2007, the author carried out extensive sampling from Belize in the north west, through Honduras, Panama, Colombia, Venezuela, Aruba, Bonaire, and Curaçao (ABCs), Trinidad and Tobago, Windward Islands and Leeward Islands, British and US Virgin Islands, Puerto Rico, and Exumas in the Bahamas. Many lots of *Gibberula* were collected, but only a very small part of the Caribbean has been even partially sampled, and a vast amount of work remains to be done.

All described Caribbean *Gibberula* known to the author belong to one group with sizes ranging from approximately 1.2 mm to 3.9 mm, except for one species, *G. ocellus* Dall, 1927, from Georgia, U.S.A., a deep water species measuring between 5 and 5.5 mm which is almost twice as large. Otherwise, the larger *Gibberula*, such as the Mediterranean *G. oryza* Lamarck, 1822, appear to be absent.

Specific assignment has been based on the examination of shell and animal morphology. A number of radulae were examined, and in one case, *G. granulinaformis* n. sp. (Fig. 29), this was found to be useful for confirmation of correct generic assignment.

As far as possible digital images of all shells and live animals of new species described herein have been figured in the plates. All images are reproduced at 18X magnification, unless otherwise stated, in order to give a true perspective and to assist in the recognition of some species where size is a significant factor.

Some common diagnostic features of the genus are not repeated in descriptions. These include 'external varix is absent', 'anterior notch present', 'posterior notch present', 'Type 4 animal', 'mantle not usually extending over external shell surface'. Where the term 'semi-transparent' is applied to the shell, this refers to live specimens - once animals die shells quickly become translucent white or opaque. In many cases descriptions are silent on the number of whorls in the protoconch and teleoconch as these features are often partially or totally obscured by callus deposits. Assessment of foot length of live animals is subjective - in their natural habitat external parts are normally fully extended, but in the aquarium, when being photographed, this is not often so. Live animals are photographed in dorsal view, therefore dorsal views of dried shells have not been figured.

METHODS AND MATERIALS

Hand dredging in sand or muddy substrates and the use of a hand operated suction pump on rocks and rubble substrates were the most productive methods of collecting *Gibberula* in shallow waters, down to approximately 30 metres. Night diving yielded some positive results as specimens could be picked up from sand and rubble, or off rocks. Many species were collected by dredging from the author's yacht "Marina Em" with the aid of a small hydraulically operated reel. The resultant grit from all methods of collection was screened into four grades. Finer screenings were placed in a bowl of sea water and covered. Live animals then crawled up the sides where they could be picked up. Finer grades of grit from deep dredging were sorted visually for dead shells which comprised about 98 percent of all shells collected by this method. This is very slow and time consuming work which may partly account for the paucity of known deep water *Gibberula* to date.

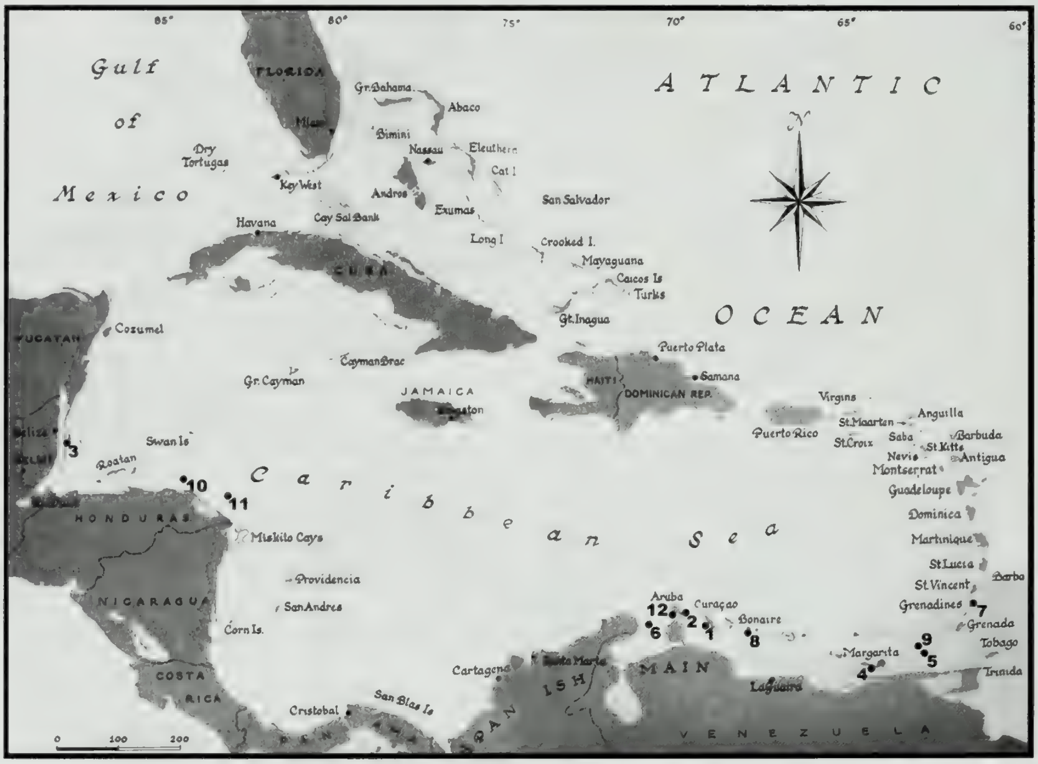
Samples from live material were photographed in a small aquarium below a microscope with digital camera mounted on top. The same equipment was used for detailed imaging of dried shells. The system, is calibrated so that shell dimensions can be obtained from data displayed by the software. All relevant data, including a chosen shell image is entered into the author's database. One special feature of the database is a comparator which enables a simple and very effective means for comparing two or more shell images. This has been very useful in highlighting small morphological differences.

When extracting radulae from these minute shells a very small screw vice was used to crack the shells as the flushing method was found to be impossible to perform. Conventional methods were used to locate, clean and mount radulae in slides for imaging and study. Regrettably optical microscopy, used by the author, has insufficient resolution for imaging these minute radulae. Although the images are generally unsuitable for reproduction it was possible to discern the plates and cusps, and to measure and record much useful data, but this was only carried out in a few specific cases.

ABBREVIATIONS

MNHN: Museum National d'Histoire Naturelle, Paris, France.
AWC: Andrew Wakefield Collection.
TMC: Tony McCleery Collection.
ad.: adult specimen.
juv.: juvenile specimen.
dd.: dead collected.
lv.: live collected.
L.: shell length.
W.: shell width.
TS.: Type species.

The author has, in general, followed terminology established by Coovert and Coovert (1995).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75°
70°
65°
60°
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FLORIDA
Gr.Bahama
Abaco
Bimini
Nassau
Eleuthera
Cat I
Dry Tortugas
Key West
Andros
Exumas
Havana
Cay Sal Bank
Long I
San Salvador
Crooked I.
Mayaguana
Caicos Is
Turks
CUBA
Gt.Inagua
ATLANTIC OCEAN
N
YUCATAN
Cozumel
Cayman Brac
Gr.Cayman
JAMAICA
Kingston
Puerto Plata
Samana
HAITI
DOMINICAN REP.
Virgins
Puerto Rico
St.Croix
St.Maarten
Anguilla
Saba
Barbuda
St.Kitts
Nevis
Antigua
Montserrat
Guadeloupe
Dominica
Martinique
St.Lucia
Barbados
St.Vincent
Grenadines
Grenada
Tobago
Trinidad
Belize
Swan Is
Roatan
HONDURAS
Miskito Cays
Caribbean Sea
Providencia
San Andres
NICARAGUA
Corn Is.
COSTA RICA
Cartagena
Santa Marta
Cristobal
San Blas Is
SPANISH MAIN
Aruba
Curaçao
Bonaire
Margarita
La Guaira
VENEZUELA
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Map 1. Caribbean Sea and Type localities of new species

1. Curaçao, Spaanse Water, 12°04.4'N 68°51.0'W; **2.** Aruba, Boca Grandi, 12°27.3'N 69°52.6'W; **3.** Belize, 17°15.6'N 88° 02.5'W; **4.** Venezuela, Isla Coche, 10°49.8'N 63°56.7'W, 35 m, shelly mud; **5.** Venezuela, Islas Los Testigos, Isla Conejo, 11°22.6'N 63°05.1'W; **6.** Venezuela, Monjes del Sur, harbour; 12°21.4'N 70°54.0'W; **7.** West Indies, S.V.G., Isle Quatre, 12°57.6'N 61°15.0'W; **8.** Venezuela, Aves de Sotavento, 12°03.5'N 67°40.5'W; **9.** Venezuela, off Islas Los Testigos, 11°26.3'N 63°06.6'W; **10.** Honduras, off to north east, 16°06.4'N 84°32.5'W; **11.** Honduras, Cayos Vivarillo, 15°51.1'N 83°18.3'W; **12.** Aruba, south west coast, 12°29.8'N 70°01.7'W.

SYSTEMATICS

Family **CYSTISCIDAE** Stimpson, 1865.
Subfamily **PERSICULINAE** Coovert and Coovert, 1995.
Genus ***Gibberula*** Swainson, 1840.
Type species. *G. zonata* Swainson, 1840, = *Volvaria oryza* Lamarck, 1822, West Africa, by monotypy.

List of the Caribbean *Gibberula* species

Gibberula agricola Faber, 2005. Margarita, Venezuela.
Gibberula aldridgei Usticke, 1968. *Nomen dubium.* Tortola B.V.I., 4 mm.
Gibberula benyi Espinosa & Ortea, 2005. Pinar del Rio, Cuba.
Gibberula bribri Espinosa & Ortea, 2000. Punta Mona, Manzanillo, Costa Rica.
Gibberula evadne Dall & Simpson, 1901. Mayaguez Harbour, Puerto Rico.
Gibberula lavalleeana d'Orbigny, 1842. Jamaica. = *Marginella minima* Sowerby, 1846.
Gibberula macarioi Espinosa & Ortea, 2005. Pinar del Rio, Cuba.
Gibberula mandyi Espinosa & Ortea, 2005. Pinar del Rio, Cuba.
Gibberula marioi Espinosa & Ortea, 2000. Manzanillo, Costa Rica.
Gibberula ocellus Dall, 1927. Off Fernandina, Georgia. U.S.A.
Gibberula olivai Espinosa & Ortea, 2005. Pinar del Rio, Cuba.
Gibberula pfeiffer Faber 2004. *Nomen novum.* Cuba. = *Marginella minuta* Pfeiffer 1840, not *Marginella minuta* Gray 1829.
Gibberula sierra Espinosa & Ortea, 2000. Punta Mona, Manzanillo, Costa Rica.
Gibberula tenera Menke, 1830. *Nomen dubium.* Puerto Rico.
Gibberula ubitaensis Espinosa & Ortea, 2000. Punta Ubita, Manzanillo, Costa Rica.
Gibberula yidii Cossignani, 2006. La Guajira, Colombia.

Gibberula aperta n. sp.
Figs. 44, 45

Type material. Curaçao, Spaanse Water, 12°04.4'N 68°51.0'W, 1-2 m, rocks and rubble. Holotype. 1.58 x 1.04 mm, W:L 66%, ad. lv., MNHN 20465; Paratype 1. 1.90 x 1.25 mm, W:L 65%, ad. lv., MNHN 20481; Paratype 2. 1.57 x 1.00 mm, W:L 64%, ad. lv., AWC; Paratype 3. 1.93 x 1.21 mm, W:L 63%, ad. lv., TMC; Paratype 4. 1.77 x 1.11 mm, W:L 63%, ad. lv., TMC; Paratype 5. 1.67 x 1.12 mm, W:L 67%, ad. lv., AWC.

Other material. 7 ad. lv., 4 ad. dd., from lot of approximately 500 specimens. Curaçao, Spaanse Water, 12°04.4'N 68°51.0'W, 1-2 m, rocks and rubble.
Type locality. Curaçao, Spaanse Water, 12°04.4'N 68°51.0'W. (Map: Ref. 1).

Description. Shell smooth, glossy, semi-transparent, obovate, size range 1.57 x 1.00 mm to 1.93 x 1.21 mm, W:L 63-67%, spire smooth sided, very low, suture indistinct, apex rounded, 3.5 to 4 whorls including protoconch, suture sweeps up strongly to high insertion point, shoulder moderately strong, posterior notch weak. Lip almost straight, parallel to shell axis, slightly thickened, slightly raised posteriorly, flared anteriorly, labial denticles and lirae absent. Three columellar plications and two lirae fill half of aperture. Second strongest, short, third very weak, lirae get progressively weaker posteriorly. Anterior callus forms weak, short, almost vertical ridge between first plication and external end of second. Very light callus wash extends to posterior notch and over suture, parietal callus ridge present on slightly convex parietal wall. Aperture moderately wide posteriorly, widening evenly, becoming very wide anteriorly. Animal. Foot approximately 30% longer and same width as shell, semi-transparent with 4 weak white or slightly yellowish-white marking along sides, two stronger ones extending posteriorly, marks extend almost to edge of foot. Dull orange spots present on transparent areas of foot intermingled with fewer small black spots. Lobes of split head yellowish-white, translucent white edges and extremities, tentacles short, semi-transparent, without markings. Eyes black, some adjacent orange spots. Siphon short, opaque yellowish-white. General appearance of live specimens very dark. Mantle roof comprised of large dull brownish-green areas with dull orange and darker brown or black spots, and some yellowish areas intermingled with dull orange spots, same dull pattern present beneath early teleoconch whorls.

Distribution. Only known from Type locality.

Habitat. Rocks and rubble at approximately 1 metre deep, slight tidal current. Rocks generally heavily covered with various weed types and variable amounts of muddy sand. Spaanse Water is a large tidal lagoon with still, relatively shallow water. It is probable that the salinity of the water is slightly higher than surrounding open sea, because tidal flow is minimal, and the normally strong wind and sun must cause considerable evaporation.

Discussion. *Gibberula aperta* n. sp. must be compared with *Gibberula vitium* n. sp. (Figs. 68 to 73). The aperture of *G. aperta* n. sp. is moderately wide posteriorly, widening evenly throughout its length, becoming very wide anteriorly, labial denticles are absent. *G. vitium* n. sp. is larger, has a slightly narrower aperture, lip denticulate, less thickened, not parallel to axis of shell, different animal chromatism, and in particular, is separated from *G. aperta* n. sp. by its distinctly kinked second plication. *Gibberula aperta* n. sp. is abundant and appears to be endemic to Spaanse Water, Curaçao. De Jong and Coomans (1988) make no reference to any species which could reasonably be compared with *G. aperta* n. sp.

Etymology. The name alludes to the wide aperture of *G. aperta* n. sp. The Latin 'apertus' can be translated as 'open'.

Gibberula arubagrandis n. sp.

Figs. 1-2, 4-5

Type material. Aruba, Boca Grandi, 12°27.3'N 59°52.6'W, 1-2 m, clean sand. Holotype. 3.31 x 1.70 mm, W:L 51%, ad. lv., MNHN 20466; Paratype 1. 3.06 x 1.65 mm, W:L 54%. ad. lv., MNHN 20482; Paratype 2. 2.83 x 1.57 mm, W:L 56%, ad. lv., AWC; Paratype 3. 2.62 x 1.41 mm, W:L 54%, ad. lv., TMC; Paratype 4. 3.10 x 1.59 mm, W:L 50%, juv. lv., TMC; Paratype 5. 2.58 x 1.49 mm, W:L 58%, ad. lv., AWC.

Other material. 1 juv. lv., Aruba, Boca Grandi, 12°27.3'N 59°52.6'W, 1-2 m, clean sand.

Type locality. Aruba, Boca Grandi, 12°27.3'N 69°52.6'W. (Map: Ref. 2).

Description. Shell smooth, glossy, translucent white, ovate, size range 2.58 x 1.49 mm to 3.31 x 1.70 mm, W:L 51-58%, spire low, apex moderately pointed, suture slightly stepped caused by new growth overlapping it with fine, distinct growth marks, suture sweeps up to high labial insertion point clearly below suture on previous whorl, shoulder strong, angular (occasionally weak and sloping). Lip slightly curved, thickened, slightly flared anteriorly, strongly denticulate, 18 denticles filling inner edge. Three columellar plications and two lirae fill less than half aperture, first strong, thickened, raised medially with small keel, second strong, third and lirae progressively weakening. Anterior callus surrounds outer end of first two plications, slightly textured callus wash extends from third plication to posterior notch, weak parietal callus ridge present. Aperture moderately wide, widening slightly throughout length. Animal. Foot translucent white anteriorly, semi-transparent posteriorly, approximately 20% longer, slightly wider than shell, five white marks on sides, two stronger white patches extending posteriorly, pale orange spots between. Split head translucent white, white medially, tentacles very small, translucent white, unmarked, one pale orange spot on head at base of each. Eyes black. Siphon very short, white. Mantle roof of live specimens strikingly white, one constant and distinctive mark, orange with black border present, finger shaped, positioned (in dorsal view with the head downwards) in anterior right quarter at side, pointing inwards and slightly downwards (additional, weaker, not constant marks occur on darker specimens).

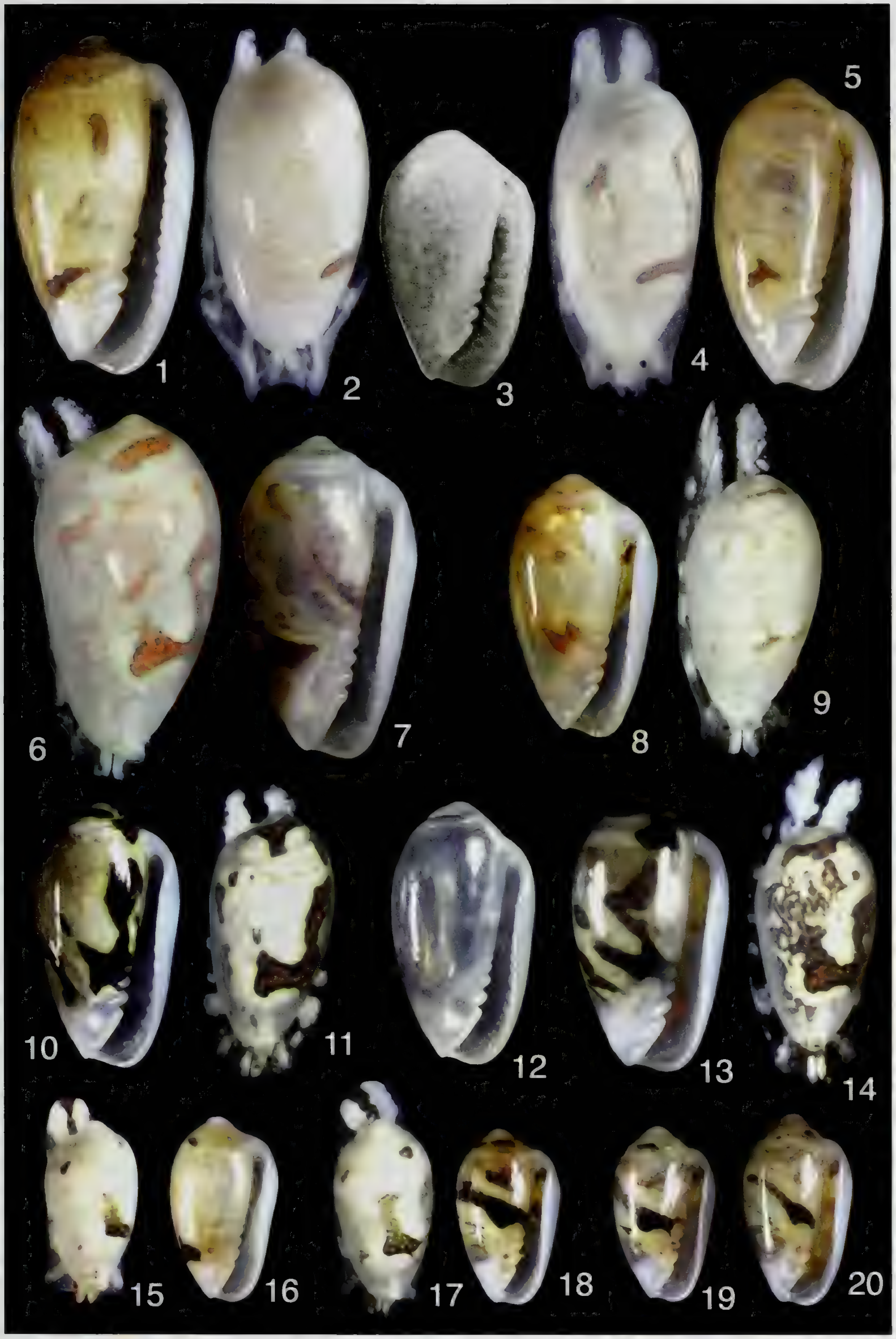
Distribution. Only known from Type locality

Habitat. Narrow lagoon, partially protected from easterly trade wind by broken reefs covered with moderately heavy weed growth, water, clean, turbulent. *G. arubagrandis* n. sp. inhabits clean, white sand, areas of finer sand being preferred.

Discussion. *Gibberula arubagrandis* n. sp. is a large, closely related species of *Gibberula evadne* Dall and Simpson, 1901, (Fig. 3) with many features being found in both species. In addition to its large size, differences are lower W:L ratio, almost straight inside edge of the lip, high labial insertion point, colour of animal, and simple, constant, distinctive mantle roof pattern. *G. evadne* Dall and Simpson, 1901, is more inflated, smaller, varying from 1.9 mm. to 2.5 mm, W:L ratio 59-64%, only rare specimens falling outside this range. Labial insertion point lower, shoulder generally very weak, sloping, aperture and lip more curved. Colour varies considerably, but rarely compares with that of *G. arubagrandis* n. sp. Mantle roof pattern is much more developed. Almost every colony of *G. evadne* Dall and Simpson, 1901, sampled in the south and eastern Caribbean, contains approximately 10 to 20 percent of animals with grey or black chromatism, which has not been recorded in *G. arubagrandis* n. sp. The author did not collect *G. evadne* Dall and Simpson, 1901, in Aruba. De Jong and Coomans (1988: 201, fig. 545) illustrate *G. evadne* Dall and Simpson, 1901, but do not give its locality which could well be Curaçao where the author also collected this species.

Figures 1-20

1-2. *G. arubagrandis* n. sp. Holotype, Aruba, Boca Grandi, 1-2 m; **3.** *G. evadne* Dall & Simpson, 1901, Holotype, Kaicher card 6212, Type Locality: Mayaguez Harbour, Puerto Rico, 2.5 mm, approx., juvenile shell; **4-5.** *G. arubagrandis* n. sp. Paratype 1, Aruba, Boca Grandi, 1-2 m; **6-7.** *G. fortis* n. sp. Holotype, Venezuela, Los Monjes del Sur, harbour, 16 m; **8-9.** *G. fortis* n. sp. Paratype 1, Venezuela, Los Monjes del Sur, harbour; **10-11.** *G. quatrefortis* n. sp. Holotype, West Indies, S.V.G., Isle Quatre, 7-12 m; **12.** *G. quatrefortis* n. sp. Paratype 2, West Indies, S.V.G., Isle Quatre, 7-12 m; **13-14.** *G. quatrefortis* n. sp. Paratype 1, West Indies, S.V.G., Isle Quatre, 7-12 m; **15-16.** *G. fortisminor* n. sp. Paratype 1, West Indies, S.V.G., Isle Quatre, 2-3 m; **17-18.** *G. fortisminor* n. sp. Holotype, West Indies, S.V.G., Isle Quatre, 2-3 m; **19.** *G. fortisminor* n. sp. Paratype 3, West Indies, S.V.G., Isle Quatre, 2-3 m; **20.** *G. fortisminor* n. sp. Paratype 2, West Indies, S.V.G., Isle Quatre, 2-3 m.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Etymology. The name is taken from the Latin 'Grandis' meaning 'large' or 'tall' combined with the Type locality.

Gibberula belizensis n. sp.

Figs. 32-37

Type material. Belize, 17°15.6'N 88° 02.5'W, 115-142 m, muddy sand. Holotype. 1.96 x 1.45 mm, W:L 74%, ad. lv., MNHN 20467; Paratype 1. 2.07 x 1.53 mm, W:L 74%, ad. dd., MNHN 20483; Paratype 2. 1.74 x 1.30 mm, W:L 75%, ad. dd., AWC; Paratype 3. 1.78 x 1.31 mm, W:L 74%, ad. dd., TMC; Paratype 4. 1.76 x 1.33 mm, W:L 76%, ad. dd., TMC; Paratype 5. 2.00 x 1.46 mm, W:L 73%, ad. dd., AWC.

Other material. 34 ad. dd., 19 juv. dd., Belize, 17°15.6'N 88° 02.5'W, 115-142 m, muddy sand.

Type locality. Belize, 17°15.6'N 88° 02.5'W. (Map: Ref. 3).

Description. Shell smooth, shiny, translucent white, triangular, size range 1.74 x 1.30 mm to 2.07 x 1.53 mm, W:L 73-76%, spire very low, apex rounded, 3.5 to 4 whorls, suture sweeps up to high labial insertion point at suture of previous whorl, shoulder moderately strong, posterior notch weak. Lip straight, slightly raised, thickened posteriorly, not flared, 11 weak denticles fill whole length, extends below level of very weak anterior notch. Three moderately strong columellar plications and one week lira fill less than half of aperture, anterior callus not strong, light wash extends to posterior notch, parietal callus ridge present. Aperture moderately wide, straight. Animal. Length of foot not observed, semi-transparent, several white marks on sides, two longer marks extending posteriorly, orange spots between. Lobes of split head white medially, transparent edges and extremities, orange marks present, tentacles short, semi-transparent, unmarked. Eyes black. Siphon short, white. Mantle roof variegated white, green, orange, and black, same chromatism extends below preceding whorls.

Distribution. Only known from the Type locality.

Habitat. Dredged outside vital reef at approximately 130 m in clear water with slight tidal current. Limited evidence suggests muddy sand substrate.

Discussion. This minute species is compared with *Gibberula occidentalis* n. sp. (figs. 46-49) from Honduras, N.E., a species of similar size, dredged in 65 m. Small, distinct differences exist between the two species. *Gibberula belizensis* n. sp. has an unusually weak anterior notch, weak labial denticles, shell relatively elongate, marks on foot solid white. *G. occidentalis* n. sp. has strong anterior notch, fewer strong labial denticles, very inflated shell, marks on foot comprised of minute spots. Both species show the greenish hue associated, by the author, with sand or mud substrates at dredging depths.

Etymology. The name is taken from the Type locality.

Gibberula celerae n. sp.

Figs. 54-56

Type material. Venezuela, Isla Coche, 10°49.8'N 63°56.7'W, 35 m, shelly mud. Holotype. 2.02 x 1.29 mm, W:L 64%, ad. lv., MNHN 20468; Paratype 1. 1.91 x 1.21 mm, W:L 63%, ad. lv., MNHN 20484; Paratype 2. 1.97 x 1.25 mm, W:L 63%, ad. lv., TMC; Paratype 3. 1.99 x 1.24 mm, W:L 62%, ad. lv., AWC; Paratype 4. 2.20 x 1.30 mm, W:L 59%, ad. lv., AWC; Paratype 5. 2.02 x 1.22 mm, W:L 60%, ad. lv., TMC.

Other material. 3 ad. lv., Venezuela, Isla Coche, 10°49.8'N 63°56.7'W, 35 m, shelly mud; 21 ad. lv. and 3 juv. lv., Venezuela, Isla Cubagua, 10°50.2'N 63°58.4'W, 18 m, rubble amongst sand.

Type locality. Venezuela, Isla Coche, 10°49.8'N 63°56.7'W, 35 m, shelly mud. (Map: Ref. 4).

Description. Shell smooth, shiny, semi-transparent, sub triangular, size range 1.91 x 1.21 mm to 2.20 x 1.30 mm, W:L 59-64%, spire very low, smooth, straight sides, suture indistinct, apex slightly pointed, suture sweeps up strongly to labial insertion point at suture on previous whorl, shoulder strong, posterior notch weak. Lip straight, thickened posteriorly, flare extends below anterior notch, 7 moderately strong denticles fill half lip, strongest medially, weak on flare. Three columellar plications and one lira fill approximately 35% of aperture, first and second moderately strong, third weaker, anterior callus weak, light wash extends from plications to posterior notch, strong parietal callus ridge present. Aperture moderately wide, widening anteriorly. Animal. Foot approximately 30% longer, slightly wider than shell, semi-transparent, 5 yellowish-white marks on sides, two longer ones extending posteriorly, marks not extending to edge of foot, some orange spots present between marks. Lobes of split head semi-transparent, yellowish-white marks medially, orange marks laterally. Tentacles short, semi-transparent, unmarked (occasionally with orange marks). Eyes black. Siphon short, translucent white. Mantle roof extensively covered by green areas with orange spots and paler yellowish-white areas also with orange spots, darker areas partially outlined with black, similar chromatism present beneath teleoconch whorls. An outstanding trait is the speed at which this species moves - approximately twice that of other Caribbean *Gibberula* species.

Distribution. Known from Type Locality and adjacent deeper water north of Isla Cubagua.

Habitat. All specimens were dredged at 18 or 35 metres in shelly mud or sand. These two adjacent localities are situated in the Margarita Channel which has moderate tidal currents.

Discussion. This species should be compared with *Gibberula velox* n. sp. (Figs. 50-53) from Aruba, which is a closely related species. Both have approximately the same mantle roof pattern, similar shell shape and size, and similar speed of movement, otherwise there are some significant differences. *G. velox* n. sp. was collected from hard algal growth on rocks, at night, has more, finer labial denticles, chromatism has a whitish hue. In *G. celerae* n. sp. chromatism has a strong green hue which appears to be associated with habitat and was observed by the author in most live dredged *Gibberula*. The habitat of these two new species is very different.

Etymology. The name alludes to the speed at which *G. celerae* n. sp. moves, and is taken from the Latin 'celer' meaning 'quick'.

G. conejoensis n. sp.

Figs. 21-25

Type material. Venezuela, Islas Los Testigos, Isla Conejo. Holotype. 11°22.6'N 63°05.1'W, 2 m, mossy sand on rocks, 2.55 x 1.66 mm, W:L 65 %, ad. lv., MNHN 20469; Paratype 1. 11°22.7'N 63°06.0'W, 18 m, rubble, 2.94 x 1.92 mm, W:L 65 %, ad. lv., MNHN 20485; Paratype 2. 11°22.6'N 63°05.1'W, 2 m, mossy sand on rocks, 2.60 x 1.70 mm, W:L 65 %, ad. lv., AWC; Paratype 3. 11°22.6'N 63°05.1'W, 2 m, mossy sand on rocks, 2.25 x 1.47 mm, W:L 65 %, ad. lv., TMC; Paratype 4. 1°22.6'N 63°05.1'W, 2 m, mossy sand on rocks, 2.32 x 1.51 mm, W:L 65%, ad. lv., TMC; Paratype 5. 1°22.6'N 63°05.1'W, 2 m, mossy sand on rocks, 2.31 x 1.52 mm, W:L 66%, ad. lv., AWC.

Other material. 5 ad. lv., 3 juv. lv., Venezuela, Islas Los Testigos, Isla Conejo, 11°22.6'N 63°05.1'W, 2m, mossy sand on rocks; 3 ad. lv., 7 juv. lv., Venezuela, Islas Los Testigos, Isla Conejo, 11°22.7'N 63°06.0'W, 18 m. rubble.

Type locality. Venezuela, Islas Los Testigos, Isla Conejo, 11°22.6'N 63°05.1'W. (Map: Ref. 5).

Description. Shell, smooth, glossy, semi-transparent, obovate, size range 2.25 x 1.47 mm to 2.94 x 1.92 mm, W:L 65-66%, spire very low, apex slightly pointed, suture indistinct, sweeps up to labial insertion point at suture on previous whorl, shoulder and posterior notch moderately strong. Lip straight internally, thickened, completely filled with 18 denticles located slightly below internal edge, weak posteriorly, and weak anteriorly on moderate flare. Three strong columellar plications and two lirae fill approximately half aperture, first thickened medially, small keel present, heavy anterior callus deposit, light wash extends to posterior notch, thickened medially, weak parietal callus ridge present. Aperture wide, widening more anteriorly. Animal. Foot approximately 30% longer and slightly wider than shell, semi-transparent, 4 yellowish-white marks on sides and 2 longer white marks extending posteriorly, all extending to edges of foot, spaces between marks bear many dull orange spots. Split head and tentacles semi-transparent, head yellowish-white medially with many adjoining orange marks, tentacles unmarked. Eyes black. Siphon white, unmarked. Mantle roof with yellowish-white background variegated with fine reddish-orange spots, pattern with 4 constant irregularly shaped marks formed by many contiguous reddish orange spots, green areas centrally, edged with black, in dorsal view largest mark located slightly right of centre, smaller vertically elongate mark located on left side, 2 small marks located below suture, one to left, one to right, similar chromatism located under the teleoconch whorls, apex yellowish-white.

Distribution. Only known from the Type locality.

Habitat. Rock and rubble covered with mossy sand at 2 m, also rubble at 18 m (dredged).

Discussion. *Gibberula conejoensis* n. sp. is compared with *Gibberula jenphillipsi* n. sp. (Figs. 63-67), a more inflated shell with strong, anterior, axial, callus ridge which is diagnostic, and totally different mantle roof pattern, and *Gibberula fortis* n. sp. (Figs. 6-9), an elongate species with distinctive flat topped second plication and totally different mantle roof pattern. *Gibberula stella* n. sp. has similarities in mantle roof pattern which indicates a close relationship, but is otherwise distinctly different.

Etymology. The name is taken from Type locality

Gibberula fortis n. sp.

Figs. 6-9

Type material. Venezuela, Los Monjes, 12°21.4'N 70°54.0'W,16 m, muddy sand. Holotype. 3.17 x 1.82 mm, W:L 58%, ad. lv., MNHN 20470; Paratype 1. 3.38 x 1.88 mm, W:L 56%, ad. lv., MNHN 20486; Paratype 2. 3.59 x 1.93 mm, W:L 54%, ad. dd., AWC; Paratype 3. 3.25 x 1.83 mm, W:L 56%, ad. lv., TMC.
Columbia, San Andres, 12°33.6'N 81°40.8'W, 2 m, coarse sand.
Paratype 4. 2.58 x 1.47 mm, W:L 57%, ad. lv., AWC;
Paratype 5. 2.76 x 1.62 mm, W:L 59%, ad. lv., TMC.

Other material. 1 ad. lv., Venezuela, Los Monjes, 12°21.4'N 70°54.0'W, 16 m, muddy sand; 6 ad. lv., 12 juv. lv., Columbia, San Andres, 12°33.6'N 81°40.8'W, 2 m, coarse sand

Type locality. Venezuela, Monjes del Sur, harbour, 12°21.4'N 70°54.0'W. (Map: Ref. 6).

Description. Shell smooth, glossy, translucent white, obovate, size range 2.58 x 1.47 mm to 3.59 x 1.93 mm, W:L 54-59%, spire low, apex pointed, suture slightly stepped with new growth overlapping previous turn with fine, distinct growth lines, suture sweeps up to labial insertion point at previous turn, shoulder weak and rounded. Lip very straight, thickened, slightly flared anteriorly, 8 weak denticles on inside, fill half. Three strong columellar plications and three lirae fill approximately half of aperture, first slightly thickened medially, small keel present, second very strong with a distinctly flattened top, anterior callus light, extending posteriorly as wash, thickening at and above posterior notch, weak parietal callus ridge present. Aperture straight, moderately wide. Animal. Foot approximately 30% longer and same width as shell, semi-transparent, six white marks on sides, two longer marks extending posteriorly, orange spots between white marks. Split head semi-transparent, white medially, orange spots at sides, tentacles short, semi-transparent, without markings. Eyes black. Siphon short, white. Mantle roof white, background variegated with faint orange markings, two strong, distinctive marks comprised of bright orange spots, edged with black, one small, approximately horizontal at lower right side, another beneath penultimate whorl.

Distribution. Known from Type locality and San Andres, Columbia.

Habitat. Monjes del Sur specimens collected in muddy sand at approximately 15 m. San Andres specimens collected in large lagoon on east side of island in clean sand patches close to coral heads in 1 to 2 m, some wave action and current caused by sea coming over vital reef.

Discussion. *Gibberula fortis* n. sp. appears to be related to *G. arubagrandis* n. sp. (Figs. 1-2 and 4-5), with which it is compared, as common features are present. Distinguishing features are the large size, distinctive markings on mantle roof, very straight inner edge to lip, weak denticles, and particularly the very flat topped second plication. *G. fortis* n. sp. is the second largest Caribbean species of *Gibberula* collected by the author.

Etymology. The name alludes to the size and robust nature of this species. The Latin word 'fortis' translates as 'strong' and 'sturdy'.

Gibberula fortisminor n. sp.

Figs. 15-20

Type material. West Indies, St. Vincent & Grenadines, Isle Quatre, 12°57.6'N 61°15.0'W, 2-3 m, mossy sand on rocks. Holotype. 1.72 x 1.03 mm, W:L 60%, ad. lv., MNHN 20471; Paratype 1. 1.63 x 0.94 mm, W:L 58%, ad. lv., MNHN 20487; Paratype 2. 1.87 x 1.07 mm, W:L 57%, ad. lv., AWC; Paratype 3. 1.71 x 1.01 mm, W:L 59%, ad. lv., TMC; Paratype 4. 1.76 x 1.01 mm, W:L 57%, ad. lv., TMC; Paratype 5. 1.69 x 0.98 mm, W:L 58%, ad. lv., AWC.

Other material. 12 ad. lv., West Indies, St. Vincent & Grenadines, Isle Quatre, 12°57.6'N 61°15.0'W.

Type locality. West Indies, St. Vincent & Grenadines, Isle Quatre, 12°57.6'N 61°15.0'W. (Map: Ref. 7).

Description. Shell smooth, glossy, translucent white, obovate, size range 1.63 x 0.94 mm to 1.87 x 1.07 mm, W:L 57-60%, spire low, apex moderately pointed, suture smooth, teleoconch whorls slightly convex, suture sweeps up slightly to labial insertion point slightly below previous turn, shoulder moderately strong, posterior notch weak. Lip straight, slightly curled inwards and raised, thickened, slightly flared anteriorly, 8 very weak denticles fill more than half. Three columellar plications and two lirae fill half of aperture, first two strong, third and lirae getting progressively weaker, moderately strong anterior callus wash extends to posterior notch, weak parietal callus ridge present. Aperture moderately wide, slightly more so anteriorly. Animal. Foot approximately 20% longer and slightly wider than shell, semi-transparent, 6 whitish marks along sides, two longer ones extending posteriorly, markings extend to edge of foot, all interspersed with orange and black spots. Lobes of split head semi-transparent, extensive whitish marks medially, orange on edges, tentacles semi-transparent, without markings. Eyes black. Siphon short, white. Mantle roof with white background, three constant and distinctive marks - a medium sized mark located anterior right quarter with weakening extension extending upwards, two smaller marks below suture, one on left side, one on right side. The marks are green or black, intermingled with dull orange spots, the black tending to encircle the green.

Distribution. Only known from the Type locality.

Habitat. West shore of Isla Quatre, on rocks covered with mossy sand and some weed at 2-3 m. Water clean, some wave action.

Discussion. *Gibberula fortisminor* n. sp. most closely resembles *Gibberula quatrefortis* n. sp. (Figs. 10-14). These two species live in adjacent habitats - the former being mossy sand covering rocks at 2-3 m, the latter being sand around the rocks at 7-12 m. Two significant differences separate the species, firstly size: length of adult specimens of *G. fortisminor* n. sp. range from 1.63 mm to 1.87 mm, and of *G. quatrefortis* n. sp. from 2.49 mm to 2.82 mm, secondly: animal chromatism is significantly different in the two species.

Etymology. The name is taken from the Type locality and close relationship to *G. quatrefortis* n. sp.

G. gradatim n. sp

Figs. 57-62

Type material. Holotype. Venezuela, Aves de Sotavento, 12°03.5'N 67°40.5'W, 1-2 m, sand, 2.33 x 1.26 mm, W:L 54%, ad. lv., MNHN 20472; Paratype 1. Venezuela, Aves de Barlovento, 11°59.6'N 67°25.2'W, 22 m, fine sand, 2.63 x 1.42 mm, W:L 54%, ad. lv., MNHN 20488; Paratype 2. Venezuela, Aves de Sotavento, 12°03.5'N 67°40.5'W, 1-2 m, sand, 2.26 x 1.21 mm, W:L 54%, ad. lv., AWC; Paratype 3. Venezuela, Aves de Barlovento, 11°59.6'N 67°25.2'W, 1-2 m, sand, 2.18 x 1.22 mm, W:L 56%, ad. lv., TMC; Paratype 4. Venezuela, Aves de Barlovento, 12°03.5'N 67°40.5'W, beach, 2.48 x 1.26 mm, W:L 51%, ad. lv., TMC; Paratype 5. Venezuela, Aves de Sotavento, 12°03.5'N 67°40.5'W, beach, 2.46 x 1.37 mm, W:L 56%, ad. lv., AWC.

Other material. 1 juv. lv., Venezuela, Aves de Barlovento, 11°59.6'N 67°25.2'W.

Type locality. Venezuela, Aves de Sotavento, 12°03.5'N 67°40.5'W. (Map: Ref. 8).

Description. Shell, finely striate body whorl, otherwise smooth, glossy, semi-transparent, subcylindrical, size range 2.18 x 1.22 mm to 2.63 x 1.42 mm, W:L 51-56%, spire low, apex moderately pointed, suture very strongly stepped, teleoconch whorls convex, suture does not sweep up to labial insertion point slightly below previous turn, shoulder strong, posterior notch moderately deep. Lip straight, thickened and slightly raised posteriorly, slightly flared anteriorly, denticles and lirae absent. Three columellar plications and one lira fill approximately 35 % of aperture, plications not strong. Anterior callus forms uneven ridge at distal end of plications, leaning towards aperture, ridge reduces in strength at third plication, continuing posteriorly as parietal callus ridge, callus present around and above posterior notch. Aperture moderately wide, slightly wider posteriorly, more so anteriorly. Animal. Foot approximately 20% longer, slightly wider than shell, semi-transparent, six white marks on sides, anterior three being larger than posterior three, two stronger white patches extending posteriorly, all interspersed with dull translucent orange spots. Split head white medially, orange spots or patches present, tentacles semi-transparent, unmarked. Eyes black. Siphon short, solid white. Mantle roof with white background and some very small weak orange markings.

Distribution. Known from the Type locality and adjacent Aves de Barlovento.

Habitat. *Gibberula gradatim* n. sp. is a sand dwelling species. Depths varied from 1 or 2 m inside lagoon to below 20 m in sand patches, between coral heads on vital reef drop-off.

Discussion. *Gibberula gradatim* n. sp. with its combination of strongly stepped sutures and convex whorls is unique amongst known Caribbean Gibberula species. It has proved to be rare with only occasional specimens being found over several years. At first it was thought to be a freak, but evidence of it being a distinct species gradually built up and eventually four live specimens were found. No colony has yet been found, all specimens were collected singly. *G. gradatim* n. sp. is endemic to Las Aves, Venezuela.

Etymology. The name alludes to the stepped sutures. The Latin 'gradatim' translating as 'step by step'

Gibberula granulinaformis n. sp.

Figs. 26-31

Type material. Venezuela, off Islas Los Testigos, 11°26.3'N 63°06.6'W, 73 m, muddy sand. Holotype. 1.76 x 1.22 mm, W:L 69%, ad. lv., MNHN 20473; Paratype 1. 1.94 x 1.32 mm, W:L 68%, ad. lv., MNHN 20489; Paratype 2. 1.88 x 1.32 mm, W:L 70%, ad. lv., AWC; Paratype 3. 1.87 x 1.37 mm, W:L 73%, ad. lv., TMC; Paratype 4. 1.86 x 1.30 mm, W:L 70%, ad. lv., AWC; Paratype 5. 1.89 x 1.22 mm, W:L 67%, ad. lv., TMC.

Other material. 14 ad. lv. 7 juv. lv., Venezuela, off Islas Los Testigos, 11°26.3'N 63°06.6'W.

Type locality. Venezuela, off Islas Los Testigos, 11°26.3'N 63°06.6'W. (Map: Ref. 9).

Description. Shell, smooth, glossy, semi-transparent, broadly elliptic, size range 1.76 x 1.22 mm to 1.94 x 1.32 mm, W:L 67-73%, spire very low, apex rounded, suture callused over, obscured, suture sweeps up slightly to labial insertion point at apex, shoulder strong, raised, posterior notch weak. Lip thickened, curled inwards medially, slightly flared anteriorly, 8 widely spaced weak denticles fill anterior half, very weak on flare. Three strong plications and two lirae fill approximately 40% of aperture. Anterior callus light, extending posteriorly as a wash, thickens strongly around posterior notch and apex, moderately strong parietal callus ridge present. Aperture curved, narrow medially, wider posteriorly, more so anteriorly. Animal. Foot approximately 20% longer and slightly wider than shell, semi-transparent, undetermined number of diffuse yellowish-white marks on sides, two longer ones extending posteriorly, some marks extending to edge, some orange spots between marks. Split head yellowish-white medially, adjacent small orange patches, tentacles semi-transparent, unmarked. Eyes black. Siphon short, solid, yellowish-white. Mantle roof randomly covered with predominantly pale, dull, greenish-yellow background, small, pale, off white, yellow, and orange spots, some small black areas with orange spots. Same chromatism present beneath teleoconch whorls. Radula, type 3, typical of *Gibberula*.

Distribution. Only known from Type locality.

Habitat. 73 m, grit brownish yellow with strongly stained, broken shells.

Discussion. *Gibberula granulinaformis* n. sp. is uniquely shaped among known Caribbean *Gibberula* species, and shells can easily be confused with those of genus *Granulina* Jousseaume, 1888. The closest comparable species is *Gibberula ubitaensis* Espinosa & Ortea, 2000, Punta Ubita, Manzanillo, Costa Rica. This western Caribbean species also has a very high labial insertion point, but is not granulinaform in shape.

Etymology. The name in taken from the shape of the shell which closely resembles that of genus *Granulina* Jousseaume, 1888.

Gibberula jenphillipsi n. sp.

Figs. 63-67

Type material. Curaçao, Spaanse Water, 12°04.4'N 68°51.1'W, <1-2 m, weedy rocks. Holotype. 2.43 x 1.64 mm, W:L 68%, ad, lv., MNHN 20474; Paratype 1. 2.35 x 1.62 mm, W:L 69%, ad. lv., MNHN 20490; Paratype 2. 2.60 x 1.69 mm, W:L 65%, ad. lv., AWC; Paratype 3. 2.61 x 1.73 mm, W:L 66%, ad. lv., AWC; Paratype 4. 2.61 x 1.68 mm, W:L 64%, ad. lv., TMC; Paratype 5. 2.28 mm, Juv., ad. lv., TMC.

Other material. 23 ad. lv., 7 juv., lv., Curaçao, Spaanse Water, 12°04.4'N 68°51.1'W, <1-2 m, weedy rocks.

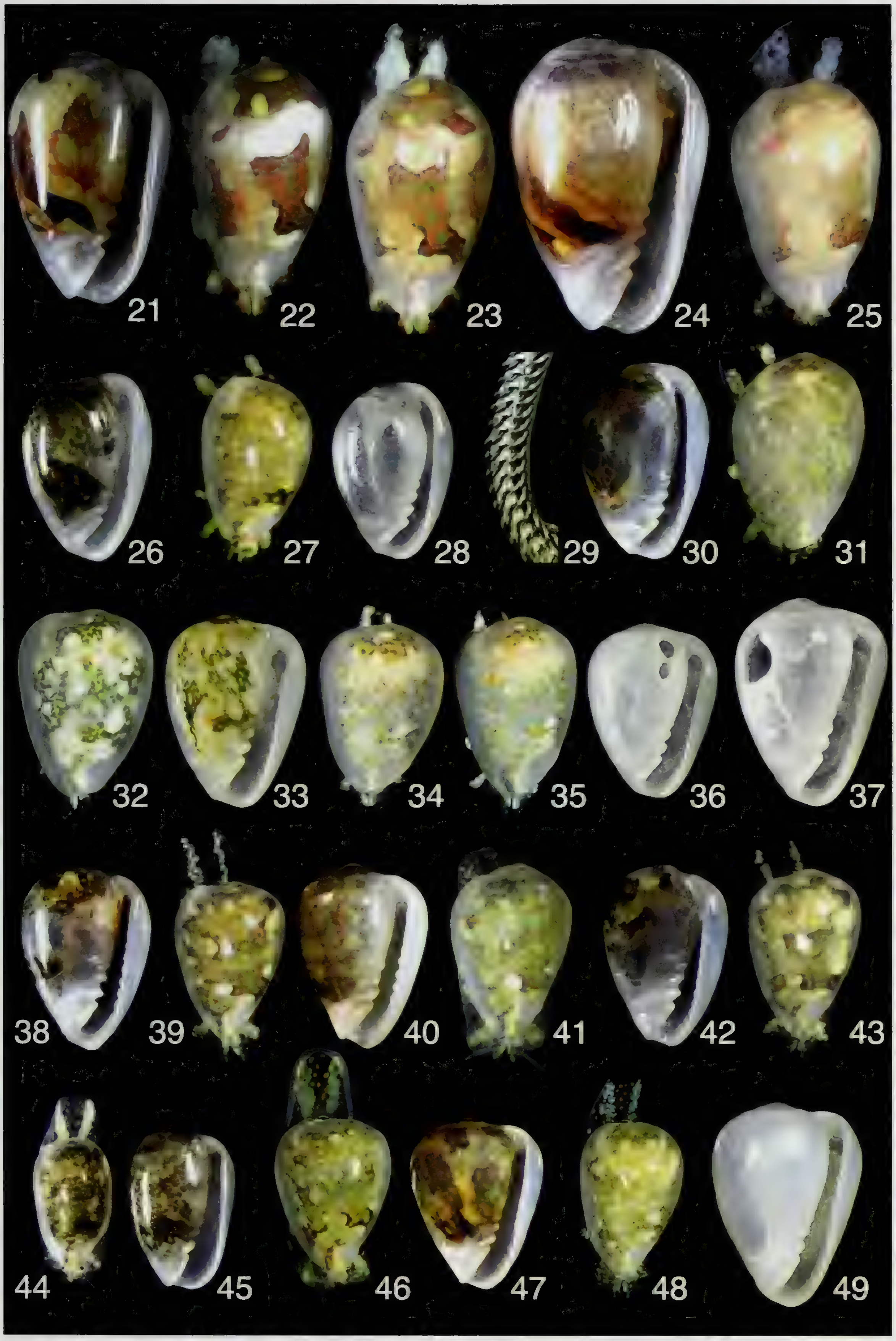
Type locality. Curaçao, Spaanse Water, 12°04.4'N 68°51.1'W. (Map: Ref. 1).

Description. Shell, smooth, glossy, semi-transparent, globose, size range 2.35x1.62 mm to 2.61x1.73 mm, W:L 64-69%, spire low, apex slightly pointed, suture smooth, indistinct, early teleoconch whorls slightly convex, suture sweeps up slightly to labial insertion point at previous turn, shoulder moderately strong, posterior notch weak. Lip slightly curved, more so anteriorly, slightly curled inwards, raised, thickened posteriorly, slightly flared anteriorly, 18 fine well defined denticles fill complete length, located close to edge posteriorly, remote from edge anteriorly, weak on flare. Three columellar plications and one lira fill half of aperture, plications merge distally with anterior callus to form distinct, short, strong, approximately vertical ridge, ridge sharply curved at junction with first plication, callus wash extends to posterior notch where it thickens, parietal callus ridge present. Aperture curved, moderately wide, widening anteriorly. Animal. Foot approximately 30% longer and slightly wider than shell, translucent white, six diffuse pale yellowish marks along sides, two longer marks extending posteriorly, marks interspersed with small black, and fewer orange spots. Lobes of split head translucent white, pale yellow marks medially, greyish-black patches, and orange spots laterally, tentacles translucent white, unmarked. Eyes black, surrounded by irregularly shaped translucent white rings. Siphon short, solid, pale yellow. Mantle roof, pale yellow background, ill-defined, predominantly dull green pattern with some orange spots, some small black areas, background appears through green pattern as approximately twelve large, more or less round marks, often merging to form larger pale yellowish background areas, same chromatism present beneath teleoconch whorls.

Distribution. Only known from the Type locality.

Figures 21-49

21-22. *G. conejoensis* n. sp. Holotype, Venezuela, Islas Los Testigos, Isla Conejo, 2-3 m; **23.** *G. conejoensis* n. sp. Paratype 2, Venezuela, Islas Los Testigos, Isla Conejo, 2-3 m; **24-25.** *G. conejoensis* n. sp. Paratype 1, Venezuela, Islas Los Testigos, Isla Conejo, 18 m; **26.** *G. granulinaformis* n. sp. Paratype 2, Venezuela, off Islas Los Testigos, 73 m; **27-28.** *G. granulinaformis* n. sp. Holotype, Venezuela, off Islas Los Testigos, 73 m; **29.** *G. granulinaformis* n. sp. Holotype, Venezuela, off Islas Los Testigos, 73 m. Gibberula, type 3, radula; **30-31.** *G. granulinaformis* n. sp. Paratype 1, Venezuela, off Islas Los Testigos, 73 m; **32-33.** *G. belizensis* n. sp. Holotype, Belize, 130 m; **34.** *G. belizensis* n. sp. Paratype 3, Belize, 130 m; **35.** *G. belizensis* n. sp. Paratype 4, Belize, 130 m; **36.** *G. belizensis* n. sp. Paratype 1, Belize, 130 m; **37.** *G. belizensis* n. sp. Paratype 2, Belize, 130 m; **38-39.** *G. oriens* n. sp. Holotype, Venezuela, off Isla Cubagua, 18 m; **40-41.** *G. oriens* n. sp. Paratype 1, Venezuela, off Cumana, 38 m; **42-43.** *G. oriens* n. sp. Paratype 5, Venezuela, off Isla Cubagua, 18 m; **44-45.** *G. aperta* n. sp. Holotype, Curacao, Spanish Water, 1 m; **46-47.** *G. occidentalis* n. sp. Holotype, Honduras, 65 m; **48.** *G. occidentalis* n. sp. Paratype 3, juv. Panama, off Chagres, 62 m; **49.** *G. occidentalis* n. sp. Paratype 1, Honduras, 65 m.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Habitat. *Gibberula jenphillipsi* n. sp. is a rock dwelling species, found in tidal channel connecting Spaanse Water with open sea and inside lagoon in areas close to entrance. This seems to indicate a preference for reasonably clean water. Many of rocks have a dense covering of various types of weed, often mixed with fine sediment. Depth was <1 to 2 metres. It was not found in the adjacent sandy areas.

Discussion. *Gibberula jenphillipsi* n. sp. stands apart from all other described Caribbean Gibberula species on account of three distinctive features: large globose shape of shell, pattern with numerous round yellowish white marks, and uniquely shaped short anterior callus ridge.

Etymology. The name acknowledges the help received from Jen Phillips, an enthusiastic collector of marginellids and close friend of the author.

G. occidentalis n. sp.

Figs. 46-49

Type material. Holotype. Honduras N.E., 16°06.4'N 84°32.5'W, 65 m, mud, 1.71 x 1.34 mm, W:L 78%, ad. lv., MNHN 20475; Paratype 1. Honduras N.E., 16°06.4'N 84°32.5'W, 65 m, mud, 1.86 x 1.37 mm, W:L 74%, ad. lv., MNHN 20491; Paratype 2. Panama, Veraguas, 9°11.9'N 81°41.3'W, 50 m. mud, 2.02 x 1.55 mm, W:L 77%, ad. dd., AWC; Paratype 3. Panama, Chagres, 9°20.7'N 80°08.9'W, 62 m, mud, 2.08 mm, juv. dd., TMC; Paratype 4. Panama, Bocas del Toro, 9°22.9'N 82°08.4'W, 55 m, mud, 1.82 x 1.42 mm, W:L 78%, ad. dd., TMC; Paratype 5. Panama, Bocas del Toro, 9°19.5'N 82°00.5'W, 66 m, mud, 2.09 x 1.56 mm, W:L 75%, ad. dd., AWC.

Other material. 1 ad. lv., 12 ad. dd., 5 juv. dd., Honduras N.E., 16°06.4'N 84°32.5'W, 65 m, mud; 3 ad. lv., 55 ad. dd., 10 juv. dd., Panama, Chagres, 9°20.7'N 80°08.9'W, 62 m. mud; 18 ad. dd., 5 juv. dd., Panama, Veraguas, 9°11.9'N 81°41.3'W, 50 m, mud; 1 ad. lv., 1 ad. dd., 2 juv. dd., Panama, Bocas del Toro, 9°22.9'N 82°08.4'W, 55 m, mud; 9 ad. dd., 4 juv. dd., Panama, Bocas del Toro, 9°19.5'N 82°00.5'W, 66 m, mud.

Type locality. Honduras, off to north east, 16°06.4'N 84°32.5'W. (Map: Ref. 10).

Description. Shell smooth, glossy, semi-transparent, triangular, inflated, size range 1.71 x 1.34 mm to 2.09 x 1.56 mm, and W:L 74% to 78%, spire very low, apex almost flat. Suture sweeps up to very high labial insertion point level with apex. Shoulder strong, posterior notch weak. Lip straight, wide, curled inwards, slightly flared, extends below level of strong anterior notch, approximately 6 weak denticles fill anterior half, very weak on flare. Three columellar plications and one lira fill slightly less than half of aperture, first strong, raised with small keel, second and third weaker, anterior callus moderately strong, light callus wash extends to posterior notch, with little parietal wall thickening. Aperture is moderately wide, slightly wider anteriorly. Animal. Foot approximately 50% longer and narrower than shell, semi-transparent, undetermined number of yellowish-white marks, interspersed with bright orange spots. Lobes of split head with yellowish marks medially and semi-transparent extremities, orange marks present, short tentacles are unmarked. Two black eyes encircled with light greyish rings are located posteriorly at base of tentacles. Siphon short, translucent yellowish-white. Mantle roof randomly covered with predominantly green background with many orange spots, and a few large yellowish-white spots. Where orange spots are grouped they are edged in black. Same chromatism present beneath the early teleoconch whorls.

Distribution. Only known in western Caribbean, from Type locality and south to Panama.

Habitat. *Gibberula occidentalis* n. sp. was dredged at a number of stations over a wide area, substrate was always soft and muddy. Dredging depths varied from 37 to 66 m, dredgings from the Chagres area of Panama were noted to contain much rotted wood debris washed out from Rio Chagres.

Discussion. This minute species is located geographically between the Type localities of *Gibberula belizensis* n. sp. (Figs. 32-37), and *Gibberula oriens* n. sp. (Figs. 38-43), and is compared with both. All are deep water species and approximately the same size. *G. belizensis* n. sp. has an unusually weak anterior notch, relatively elongate shell, and solid white marks on foot. *G. oriens* n. sp. has a heavy callus ridge at the emergent edge of a deep flat parietal wall, very strong plications which are excavated, wide lip which is curled inwards, and a distinctive elongated black mark medially at posterior end of foot. *G. occidentalis* n. sp. has a strong anterior notch, shell very inflated and marks on foot are comprised of minute spots. All three species are distinctly different.

Etymology. The name alludes to the western Caribbean distribution of *Gibberula occidentalis* n. sp. The Latin adjective for 'west' is 'occidentalis'.

Gibberula oriens n. sp.

Fig. 38-43

Type material. Holotype. Venezuela, Isla Cubagua, 10°49.7'N 64° 06.1'W, 18 m, rubble, 1.84 x 1.28 mm, W:L 70%, ad. lv., MNHN 20476; Paratype 1. Venezuela, off Cumana, 10°26.5'N 64°15.8'W, 134 m, mud, 1.89 x 1.37 mm, W:L 72%, ad. lv., MNHN 20492; Paratype 2.

Venezuela, Islas Los Testigos, 11°17.0'N 62°51.7'W.60 m, mud, 1.76 x 1.29 mm, W:L 73%, ad. dd., AWC; Paratype 3. Tobago, 11°15.3'N 60°47.0'W.86 m, mud, 1.87 x 1.43 mm, W:L 76%, ad. dd., TMC; Paratype 4. Venezuela, Isla Cubagua, 10°49.7'N 64° 06.1'W, 18 m, rubble, 1.85 x 1.34 mm, W:L 72%, ad. lv., TMC; Paratype 5. Venezuela, Isla Cubagua, 10°49.7'N 64° 06.1'W, 18 m, rubble, 1.79 x 1.26 mm, W:L 70% .ad. lv., AWC.

Other material. 3 ad. lv., 2 ad. dd., Venezuela, Isla Cubagua, 10°49.7'N 64° 06.1'W, 18 m, rubble; 3 ad. dd., Venezuela, Islas Los Testigos, 11°17.0'N 62°51.7'W, 60 m. mud; 1 ad. lv., 1 juv. lv., 1 juv. dd., Venezuela, off. Cumana, 10°26.5'N 64°15.8'W, 134 m, mud; 63 ad. dd., 5 juv. dd., Tobago, 11°15.3'N 60°47.0'W, 86 m, mud.

Type locality. Venezuela, Isla Cubagua, 10°49.7'N 64° 06.1'W. (Map: Ref. 4).

Description. Shell smooth, shiny, semi-transparent, triangular, size range 1.76 x 1.29 mm to 1.89 x 1.37 mm, W:L 70-76%. Spire very low, sides smooth, apex slightly pointed, suture very indistinct, suture sweeps up to very high labial insertion point almost level with apex. Shoulder and posterior notch moderately strong. Lip straight, wide, strongly curled inwards, extends well below level of strong anterior notch, 9 denticles fill more than half, strong medially, very weak on flare. Three very strong columellar plications and one lira (occasionally up to 4) fill more than half of aperture, anterior callus strong, light callus wash extends to posterior notch, strong parietal callus ridge present, parietal wall deep, plications excavated. Aperture, straight, relatively narrow. Animal. Foot approximately 50% longer and narrower than shell, semi-transparent, undetermined number of amorphous yellowish-white marks on sides and two longer ones extending posteriorly, interspersed with some dull orange spots and black marks, distinct elongated black mark posterior medially. Lobes of split head with greenish-yellow marks medially and semi-transparent extremities, orange and black spots present, tentacles short, semi-transparent, unmarked. Eyes black. Siphon short, translucent yellowish-white. Mantle roof with predominantly greenish-brown background and orange spots, interspersed with larger round yellowish-white marks, many small marks are edged with black, same chromatism present beneath teleoconch whorls.

Distribution. An eastern Caribbean species known to range from off Cumana, Venezuela, through the Type locality, to off Islas Los Testigos, and Tobago.

Discussion. This species is compared with *Gibberula occidentalis* n. sp. (Figs. 46-49), and *Gibberula belizensis* n. sp. (Figs. 32-37), which are of similar size and are also deep water species. The heavy parietal callus ridge, deep flat parietal wall, distinct black mark on posterior end of foot, and unusually amorphous foot markings, distinguish *G. oriens* n. sp. from all other Caribbean *Gibberula*.

Etymology. The name alludes to the eastern Caribbean distribution of *Gibberula oriens* n. sp. The Latin translation for 'east' is 'oriens'.

Gibberula quatrefortis n. sp.

Figs. 10-14

Type material. West Indies, St. Vincent & Grenadines, Isle Quatre, 12°57.6'N 61°15.0'W, 7-12 m, sand.
Holotype. 2.62 x 1.45 mm, W:L 55%, ad. lv., MNHN 20477; Paratype 1. 2.72 x 1.58 mm, W:L 58%, ad. lv., MNHN 20493; Paratype 2. 2.49 x 1.36 mm, W:L 55%, ad. dd., AWC; Paratype 3. 2.52 x 1.39 mm, W:L 55%, ad. lv., TMC; Paratype 4. 2.68 x 1.53 mm, W:L 57%, ad. dd., TMC; Paratype 5. 2.82 x 1.73 mm, W:L 61%, ad. lv., AWC.

Other material. >100 ad. lv., West Indies, St. Vincent & Grenadines, Isle Quatre, 12°57.6'N 61°15.0'W, 7-12 m, sand.

Type locality. West Indies, St. Vincent & Grenadines, Isle Quatre, 12°57.6'N 61°15.0'W. (Map: Ref. 7).

Description. Shell smooth, glossy, semi-transparent, obovate, size range 2.49 x 1.36 mm to 2.82 x 1.73 mm, W:L 55-61%, spire low, apex rounded, sutures slightly stepped with new growth overlapping previous turn, suture sweeps up to labial insertion point slightly below previous turn, shoulder sloping. Lip slightly sinuous, slightly curled inwards, raised posteriorly, thickened, flared anteriorly, 9 weak denticles fill anterior half, very weak on flare. Three strong columellar plications and three lirae fill less than half aperture, anterior callus light extending as light wash to posterior notch and suture, weak parietal callus ridge present. Aperture moderately wide and straight. Animal. Foot approximately 30% longer, slightly wider than shell, semi-transparent, seven variously sized white marks on sides, two stronger white patches extending posteriorly, dull orange spots between. Split head white medially, with orange spots, semi-transparent sides. Tentacles semi-transparent, unmarked. Eyes black. Siphon short, translucent white. Mantle roof, white background, distinctive, strong markings, black with orange spots, largest located in anterior right quarter at side, shaped somewhat like reversed 'L', similar coloured, smaller mark beneath penultimate whorl.

Distribution. Only known from the Type locality.

Habitat. *Gibberula quatrefortis* n. sp. is a sand dwelling species, preferring fine undisturbed sand. The grey sand at Type locality is comprised of a mixture of black and white sand and a small amount of other colours.

Discussion. *Gibberula quatrefortis* n. sp. appears to be closely related to *Gibberula fortis* n. sp. (Figs. 6-9), and both are sand dwellers (muddy sand in the case of *G. fortis* n. sp). Distinguishing features are: *G. fortis* n. sp. has a distinctive strong, flat topped second plication. *G. quatrefortis* n. sp. has weaker, rounded plications, and significantly stronger mantle roof pattern. They are geographically separated by approximately 300 miles.

Etymology. The name is taken from the Type locality and close relationship to *G. fortis* n. sp.

Gibberula stella n. sp.

Figs. 74-79

Type material. Holotype. Honduras, Cayos Vivarillo, 15°51.1'N 83°18.3'W, 1-2 m, rocks, 1.80 x 1.19 mm, W:L 66%, ad. lv., MNHN 20478; Paratype 1. Honduras, Cayos Vivarillo. 15°51.1'N 83°18.3'W, 1-2 m. rocks, 1.66 x 1.11 mm, W:L 67%, ad. lv., MNHN 20494; Paratype 2. Honduras, Cayos Vivarillo, 15°51.1'N 83°18.3'W, 1-2 m, rocks, 1.88 x 1.22 mm, W:L 65%, ad. lv., AWC; Paratype 3. Nicaragua, Great Corn Island, 12°10.5'N 83°03.9'W, 6 m, rubble amongst grass, 1.69 x 1.14 mm, W:L 68%, ad. lv., AWC; Paratype 4. Honduras, Roatan, Mud Hole swash, 16°21.7'N 86°31.3'W, 1-2 m, rocks and rubble, 1.71 x 1.10 mm, W:L 64%, ad. lv., TMC; Paratype 5. Honduras, Roatan, Mud Hole swash, 16°21.7'N 86°31.3'W, 1-2 m, rocks and rubble, 1.65 x 1.06 mm, W:L 64%, ad. lv., TMC.

Other material. >50 ad. lv., Honduras, Cayos Vivarillo, 15°51.1'N 83°18.3'W; 3 ad lv., 4 juv. lv., Nicaragua, Great Corn Island, 12°10.5'N 83°03.9'W; 12 ad. lv., 4 juv. lv., Honduras, Roatan, Mud Hole swash, 16°21.7'N 86°31.3'W.

Type locality. Honduras, Cayos Vivarillo, 15°51.1'N 83°18.3'W. (Map: Ref. 11).

Description. Shell smooth, glossy, semi-transparent, apex opaque white, triangular, size range 1.88x1.22 mm to 1.65x1.06 mm, W:L 64-68%, spire low, apex sharply pointed, sutures smooth, glazed over, indistinct, suture sweeps up to labial insertion point fractionally below previous turn, shoulder wide, sloping, posterior notch weak. Lip straight, thickened, curled inwards, slightly raised posteriorly, flared anteriorly, 4 very weak, widely spaced denticles on anterior half, not on flare. Three widely spaced columellar plications and one lira fill half of aperture, first slightly raised medially forming small keel. Anterior callus thick, short, strong axial ridge where first and second plications merge into it, light callus wash extends to posterior notch and over adjacent suture, parietal callus ridge present. Aperture moderately wide posteriorly, widening evenly, becoming wide anteriorly. Animal. Foot approximately 30% longer, slightly wider than shell, semi-transparent, five solid white marks along sides, two longer marks extending posteriorly, all reaching to edges of foot, white marks interspersed with small orange spots. Lobes of split head solid white medially, some adjacent orange spots. Tentacles semi-transparent, unmarked. Eyes black, some adjacent orange marks. Siphon short, solid white. Mantle roof predominantly white, comprised of 15, broadly round, contiguous, white areas forming solid white background, two brightly coloured, large, irregularly star shaped marks, and two very small marks are constant. Stars located medially, comprised of green centres, without or without orange spot, centres surrounded by contiguous orange spots extending onto points of stars, orange outlined in black, concave sides of stars each filled with one round white mark, adjacent round white marks merge at points of stars. Small marks located closely anterior to suture, one at each side, orange, outlined in black. Round white marks, separated by faint orange lines present beneath penultimate whorl.

Distribution. Western Caribbean, Nicaragua, Great Corn Island. 12°10.5'N 83°03.9'W, through the Type Locality to Honduras, Roatan, Mud Hole swash.

Habitat. Weedy or sandy rocks and rubble, shallow. This species seems to be tolerant of varied conditions.

Discussion. *Gibberula stella* n. sp. stands alone amongst the species so far described in the genus on account of its very small size, striking pattern, and striking white appearance when live. *Gibberula conejoensis* n. sp. (Figs. 21-25), has similarities in mantle roof pattern which indicates a close relationship, but is otherwise distinctly different. Redfern (2001) illustrates in colour a live specimen (Pl. 111, fig. 469C) which is closely related to *G. stella* n. sp., and two shells (Pl. 50, figs. 469 A = 469C, and B), as yet undescribed species from the Bahamas. The author has many lots of similar closely related specimens covering a wide range of shell morphology. Further study is required to establish whether *G. stella* n. sp. is a very variable species, or a member of a group of closely related species.

Examination of live animals revealed that the mantle roof pattern is three dimensional, and not a thin layer of pigmentation attached to a single flat, flexible membrane. Spots, particularly the broadly round white ones appear to be saucer shaped, floating in a transparent fluid along with all other mantle roof components, the whole of which appears to be contained within a thin transparent sack-like membrane.

Movement of components is limited so that they retain their relative positions to other components, but the whole mantle roof is very flexible, and round spots can become very distorted. At magnifications greater than X40 very fine dividing lines can be seen between the individual white spots which form the white areas on the mantle roof of *G. stella* n. sp..

Etymology. The name alludes to the star shaped pattern on the mantle roof. The Latin for 'star' being 'stella'.

Gibberula velox n. sp.

Figs. 50-53.

Type material. Aruba, 12°29.8'N 70°01.7'W, 20 m, algae on rocks. Holotype. 1.73 x 1.12 mm, W:L 65%, ad. lv., MNHN 20479; Paratype 1. 2.12 x 1.40 mm, W:L 66%, ad. lv., MNHN 20495; Paratype 2. 1.73 x 1.11 mm. W:L 64%. ad. lv., TMC;

Other material. 1 juv. lv., Aruba, 12°29.8'N 70°01.7'W, 20 m., algae on rocks.

Type locality. Aruba, south west coast, 12°29.8'N 70°01.7'W. (Map: Ref. 12).

Description. Shell smooth, glossy, semi-transparent, sub triangular, size range 1.73 x 1.12 mm to 2.12 x 1.40 mm, and W:L 64- 66%, spire very low with smooth, straight sides, 3.5 to 4 whorls, apex slightly pointed, suture sweeps up strongly to high labial insertion point at suture on previous whorl, shoulder strong, posterior notch weak. Lip slightly curved, slightly thickened, flare extending below anterior notch, 10 denticles fill more than half lip, stronger anteriorly, weak on flare. Three columellar plications and one lira fill half of aperture, first and second strong, third weaker. Anterior callus not strong, light wash extends to posterior notch, thickening and widening considerably to form an elongated pad . Aperture straight, moderately wide. Animal. Foot approximately 30% longer, slightly wider than shell, semi-transparent with 5 white marks on sides, two longer ones extending posteriorly, no other pigmentation present, marks extend to edge of foot. Lobes of split head white medially, edges and extremities transparent, some orange spots present. Tentacles short, semi-transparent, without markings. Eyes black. Siphon, short, translucent white. Mantle roof whitish with some pale dull markings comprised of orange spots on darker background. An outstanding trait of this species is the speed at which it moves.

Distribution. Only known from the Type locality.

Habitat. Taken crawling on smooth hard algae on dead coral rocks during night dive at 20 metres on steep drop-off outside vital reef. The area is extremely clean and water still.

Discussion. Considered to be closely related to *Gibberula celerae* n .sp. (Figs. 54-56), from Venezuela, Isla Coche with which it is compared. Both have approximately the same mantle roof pattern, similar shell shape and size, and similar speed of movement, otherwise they differ significantly. G. *celerae* n. sp. pigmentation has a strong green hue which appears to be associated with its deep water habitat. *G. velox* n. sp. has more, finer labial denticles, and pigmentation with a whitish hue. The habitats of these two new species are different. The bifurcated first plication of Paratype 1, (Fig. 53), is considered to be a freak occurrence, seldom seem in Caribbean *Gibberula.*

Etymology. The name alludes to the speed at which G. *velox* n. sp. moves, 'velox' being the Latin for 'rapid'.

Gibberula vitium n. sp.

Figs. 68-73

Type material. Venezuela, Islas Los Testigos, Isla Conejo, 11°22.6'N 63°05.1'W, 2 m, mossy sand on rocks. Holotype. 2.14 x 1.31 mm, W:L 61%, ad. lv.; MNHN 20480; Paratype 1. 1.93 x 1.20 mm, W:L 62%, ad. lv., MNHN 20496; Paratype 2. 2.02 x 1.25 mm, W:L 62%, ad. lv., AWC; Paratype 3. 2.18 x 1.37 mm, W:L 63%, ad, lv., TMC; Paratype 4. 2.32 x 1.41 mm, W:L 61%, ad, lv., TMC.
Trinidad, Scotland Bay, 10°41.7'N 61°40.0'W, 3-4 m, rubble. Paratype 5. 2.11 x 1.39 mm, W:L 66%, ad. lv., AWC.

Other material. >40 ad. lv., Venezuela, Islas Los Testigos, Isla Conejo, 11°22.6'N 63°05.1'W, 2 m, mossy sand on rocks; 9 ad. lv., Trinidad, Scotland Bay, 10°41.7'N 61°40.0'W, 3-4 m, rubble.

Type locality. Venezuela, Islas Los Testigos, Isla Conejo. 11°22.6'N 63°05.1'W. (Map: Ref. 5).

Description. Shell smooth, glossy, semi-translucent, obovate, size range 1.93 x 1.20 mm to 2.32 x 1.41 mm, W:L 61-66%, spire low, apex moderately pointed, suture smooth, glazed over, indistinct, suture sweeps up slightly to labial insertion point slightly below previous turn, shoulder strong, posterior notch weak. Lip straight, thickened, slightly curled inwards, slightly raised posteriorly, weakly flared anteriorly, 7 low, weak denticles fill anterior half, not present on flare. Three widely spaced columellar plications followed by three lirae fill more than half aperture, second strongest, sharply turned downwards distally to join first, weak third and subsequent lirae do not emerge significantly, anterior callus unusually heavy, slightly textured, callus wash extends to posterior notch, parietal callus ridge present. Aperture wide posteriorly, wider anteriorly. Animal. Foot approximately 30% longer, slightly wider than shell, semi-transparent, six irregularly spaced white marks on sides, two longer marks extending posteriorly, interspersed with small orange spots, all marks reach to edges of foot. Lobes of split head semi-translucent, white marks medially, orange spots adjacent. Tentacles semi-transparent, unmarked. Eyes black, encircled by greyish rings. Siphon short, solid white. Mantle roof randomly covered with either dull orange spots or ill-defined small greyish marks on black background and a number of whitish, generally round, larger marks located around edges. Many specimens have large orange-red patch medially which appears to be comprised of many very small spots merged together, similar colouring, except for red, present beneath teleoconch whorls.

Distribution. Type Locality and Trinidad, Scotland Bay, 10°41.7'N 61°40.0'W.

Habitat. Weedy rocks and rubble in locations with movement of water either from wave action, tidal current, or both. Depth 2 to 4 m. The sea can be greenish at times in the area bounded by Trinidad, the northern Venezuelan coast and Islas Los Testigos, and water temperature can be significantly lower than in other areas of the Caribbean. The author has experienced these phenomena as far westwards as Islas Tortugas. It is probable that the greenish water is rich in nutrients as the area is known to have a rich fauna – this is certainly the case with regards to Cystiscidae and Marginellidae.

Discussion. *Gibberula vitium* n. sp. most closely resembles *Gibberula aperta* n. sp. (Figs. 44-45), from Curaçao, Spaanse Water, with which it is compared. It is distinguished by its unusual, sharply turned down second plication, lower labial insertion point, narrower aperture (particularly anteriorly), and to a lesser extent its larger size. Approximately 50% of individuals show some degree of red on mantle roof (Figs. 68-69). The reason for this is not known to the author, but is believed to be, at least partly, environmental, because other undescribed *Gibberula* species and some *Granulina* species from the eastern Caribbean also show red patches in their chromatism. It is believed that this is not a specific feature. *G. vitium* n. sp. is one of several Caribbean *Gibberula* species which show a melanistic tendency (Figs. 72-73), most as yet undescribed.

Etymology. The name alludes to the sharply turned down (kinked) second plication - the Latin word for 'kink' being 'vitium'.

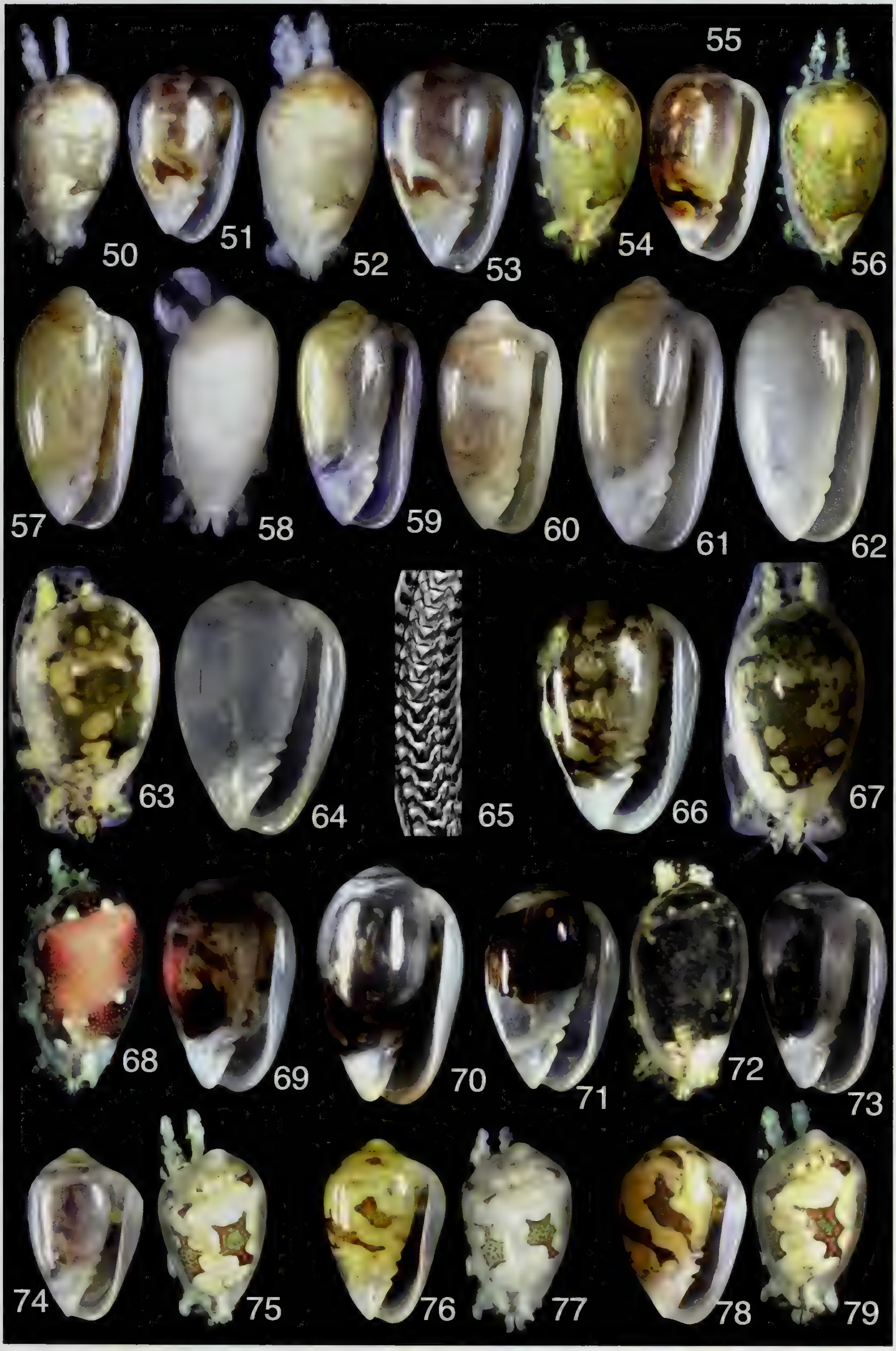
DISCUSSION

All Caribbean *Gibberula* species known to the author fall within the size range 1.23 mm to 3.95 mm (the latter being a specimen of an unidentified species, not featured in this paper), and are referred to as minute (less than 2.4 mm) to small. They are all unmarked, with one exception, *Gibberula agricola* Faber, 2005, known from Isla Margarita, Venezuela, and Tobago, a minute deep water species with five spiral rows of widely spaced brownish spots on the dorsum and one larger brown spot anterior medially on the lip. They are generally semi-transparent, occasionally translucent white, or opaque when fresh, occasionally very slightly tinted.

Large intra-colonial variations occur in shell morphology with spire height and shoulder curvature showing greatest extremes. Chromatism is generally constant except for intensity which can show extreme variations, and is an essential aid for specific assignment except in those few species with distinct specific morphological features, such as *Gibberula gradatim* n. sp. (Figs. 57-62), with its unique spire morphology.

Figures 50-79

50-51. *G. velox* n. sp. Holotype, Aruba, 20 m; **52-53.** *G. velox* n. sp. Paratype 1, Aruba, 20 m; **54-55.** *G. celerae* n. sp. Holotype, Venezuela, Isla Coche, 18 m; **56.** *G. celerae* n. sp. Paratype 1, Venezuela, Isla Coche, 18 m; **57-58.** *G. gradatim* n. sp. Holotype, Venezuela, Aves de Sotavento, shallow; **59.** *G. gradatim* n. sp. Paratype 3, Venezuela, Aves de Sotavento, shallow; **60.** *G. gradatim* n. sp. Paratype 2, Venezuela, Aves de Sotavento, shallow; **61.** *G. gradatim* n. sp. Paratype 1, Venezuela, Aves de Barlovento, shallow; **62.** *G. gradatim* n. sp. Paratype 5, Venezuela, Aves de Sotavento, shallow; **63-64.** *G. jenphillipsi* n. sp. Holotype, Curacao, Spanish Water, 1 m; **65.** *G. jenphillipsi* n. sp. Holotype, Curacao, Spanish Water, 1 m, Radula; **66-67.** *G. jenphillipsi* n. sp. Paratype 1, Curacao, Spanish Water, 1 m; **68-69.** *G. vitium* n. sp. Holotype, Venezuela, Islas Los Testigos, Isla Conejo, 2 m; **70-71.** *G. vitium* n. sp. Paratype 1, Venezuela, Islas Los Testigos, Isla Conejo, 2 m; **72-73.** *G. vitium* n. sp. Paratype 2, Venezuela, Islas Los Testigos, Isla Conejo, 2 m; **74-75.** *G. stella* n. sp. Paratype 3, Nicaragua, Great Corn Island, 1-2 m; **76-77.** *G. stella* n. sp. Holotype, Honduras, Cayos Vivarillo, 1-2 m; **78-79.** *G. stella* n. sp. Paratype 4, Honduras, Roatan, Mud Hole Swash, 1-2 m.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The distribution ranges of some species described herein are probably understated as the relevant data are not yet established. Unless otherwise stated endemism is not intentionally implied. Closely related species of most are believed, by the author, to exist and are not described in this paper. If all apparently, closely related species were lumped together, then ranges would be much greater and in some cases could possibly include the whole Caribbean. It would be easy to lump them together, but small shell and animal morphological differences which can be seen between colonies need to be carefully studied before conclusions are reached.

The shells of Caribbean *Gibberula* are perhaps the least aesthetically interesting of all marginellid species, but this is more than compensated for when the live animals are seen - almost every imaginable colour is manifest in a wide variety of beautiful patterns.

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Inventaire, potentiel et répartition des escargots terrestres d'une forêt tropicale humide de Côte d'Ivoire : le Parc National du Banco (PNB)

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MOTS CLES. Escargot, *Achatinidae*, Parc National du Banco, inventaire, potentiel (abondance), répartition.

KEYWORDS. Snails, *Achatinidae*, Banco National Park, inventory, potential (abundance), distribution.

RESUME. Les recherches effectuées dans le Parc National du Banco (PNB) consistent en un inventaire systématique et une étude écologique des *Achatinidae* peuplant cette forêt au cours de la période allant de septembre à novembre 2003 (petite saison pluvieuse). Les collectes diurnes et nocturnes de spécimens sont effectuées sur dix transects de 20 000 m^2, chacun établi de façon aléatoire dans la forêt. Il ressort de ces investigations que :
- Cette forêt renferme un certain nombre d'espèces d'*Achatinidae* dont les plus représentées sont *Achatina achatina*, *A. fulica*, *Archachatina ventricosa* et *Lignus intertinctus*.
- Ces espèces sont abondantes en septembre, soit 62 spécimens vivants échantillonnés (I_{SH} = 2,51) contre 56 en octobre (I_{SH} = 1,89) et 30 en novembre (I_{SH} = 2,13).
- Chaque espèce est présente dans les milieux fortement anthropisés (densité =35 individus/ha) avec une canopée ouverte et une litière mince.
- Enfin, leur biotope préféré est le sol ou la litière (Ish = 1,99).

ABSTRACT. We realized the systematic inventory and ecological study of land *Achatinidae* of the Banco National Park (BNP) from September to November 2003 (small rainy season). We collected *Achatinidae* specimens during the day and night along and into ten transects of 20, 000 m^2 selected in different habitats after randomized survey walks in the forest.
The results of our investigations show that :
- There are several *Achatinidae* species in this forest and the more represented are *Achatina achatina, A. fulica, Archachatina ventricosa* and *Lignus intertinctus.*
- These species are abundant in September : (62 living specimen recorded with I_{SH} = 2,51) against 56 in October (I_{SH} = 1,89) and 30 in November (I_{SH} = 2,13).
- Each of these species is present in secondary forest with much human activity (density = 35 specimen/ha), an opened canopy and a tenuous litter.
- Finally, their favorite biotope is the soil or the litter (Ish = 1,99).

INTRODUCTION

En Afrique de l'ouest et singulièrement en Côte d'Ivoire, les escargots constituent une denrée très appréciée par les populations forestières à cause de ses qualités organoleptiques et nutritionnelles *(*Zongo et al., 1990*)*. En effet, la chair de l'escargot est très riche en protéines animales, en fer et en calcium (Aboua & Boka, 1996 ; Otchoumou et al., 2003 ; 2004). En outre, l'escargot constitue une source importante de devises pour les populations forestières qui se livrent à un ramassage intensif et désordonné (sans norme et sans règle) pendant les saisons pluvieuses (Hardouin et al., 1995). Mais à cela, il faut ajouter la destruction de la forêt par les feux de brousse et la création de plantations et d'habitations (Otchoumou et al., 2003). A terme, on pourrait assister à une dénaturation du biotope de ces espèces pouvant occasionner une baisse considérable des stocks naturels de ces escargots (Otchoumou et al., 2003 ; 2004), si des mesures ne sont pas prises. Pour ce faire, il nous paraît important :

1- de faire un inventaire qualitatif et quantitatif des espèces d'escargots terrestres du Parc National du Banco ;

2- d'évaluer leur potentiel en terme d'abondance et d'étudier leur comportement à l'intérieur de leur habitat naturel en fonction du climat.

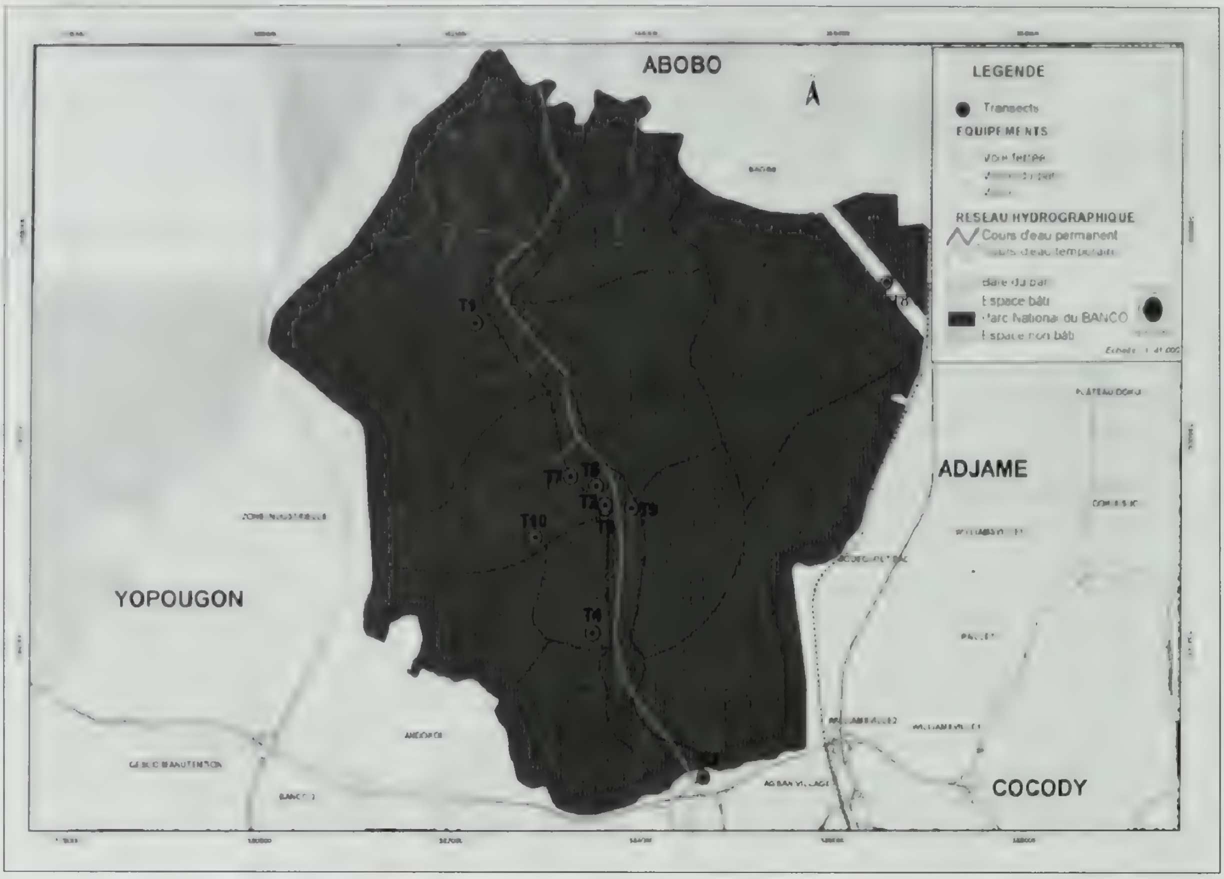


Fig. 1. Localisation de la forêt.

Matériel et Méthodes

1. Milieu d'étude : le Parc National du Banco

1.1 Situation géographique

Le Parc National du Banco s'étend sur une superficie de 3 474 ha et se situe entre 5°23 de latitude nord et 4°03 de longitude ouest. Il se trouve au nord-ouest d'Abidjan entre les communes d'Abobo, d'Adjamé et de Yopougon (Da, 1992) (Fig. 1).

1.2 Végétation et flore

C'est une forêt dense ombrophile sempervirente renfermant plusieurs espèces végétales dont les plus fréquentes sont *Turraeanthus africanus* (Meliaceae) et *Heisteria parvifolia* (Olacaceae) (Da, 1992). On y rencontre :

- de grands arbres : *Khaya ivorensis* (Meliaceae), *Carapa procera* (Meliaceae), *Piptadeniastrum africanum* (Mimosaceae), *Lophira alata* (Ochnaceae) ;
- des arbustes : *Coffea afzelii* (Rubiaceae), *Macaranga beillei* (Euphorbiaceae), *Monodora myristica* (Annonaceae) ;
- des plantes lianescentes : *Ancistrophyllum laeve* (Arecaceae) ;
- des plantes herbacées : *Palisota hirsuta* (Commelinaceae), *Geophila obvallata* (Rubiaceae) ;
- des épiphytes : *Platycerium stemaria* (Polypodiaceae), *Raphidophora africana* (Arecaceae).

1.3 Sols

Trois types de sol caractérisent la forêt du Banco : ce sont les sols sableux, les sols drainés et les sols marécageux. Leur profil, très simple, comprend deux horizons : l'horizon A, constitué par une litière très mince et l'horizon B, fait de sables tertiaires atteignant facilement 1m d'épaisseur. Ces sols sont fortement lessivés (Da, 1992).

1.4 Climat

Les températures moyennes hebdomadaires varient entre 25,4°C à 33°C tandis que l'humidité relative moyenne hebdomadaire se situe entre 67,5% et 95,5% (Fig. 2 et 3).

Figure 2 : Evolution de la température moyenne (sept- oct-nov)

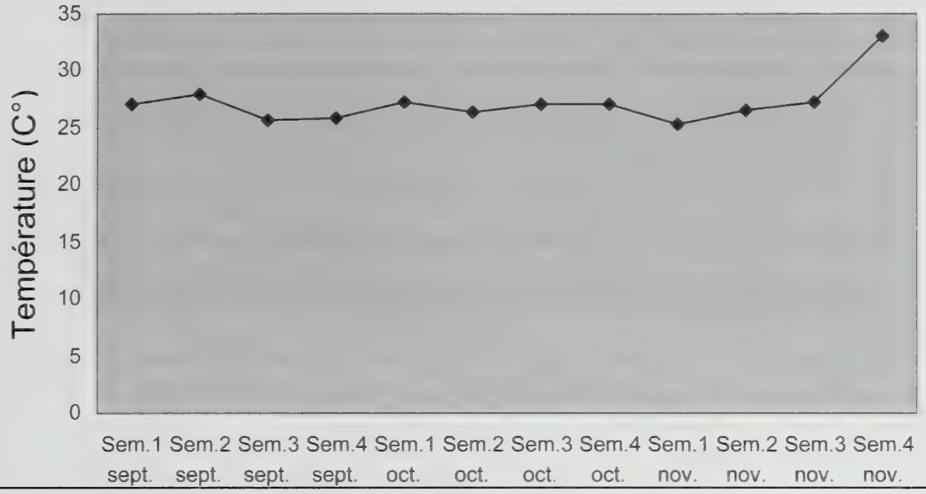
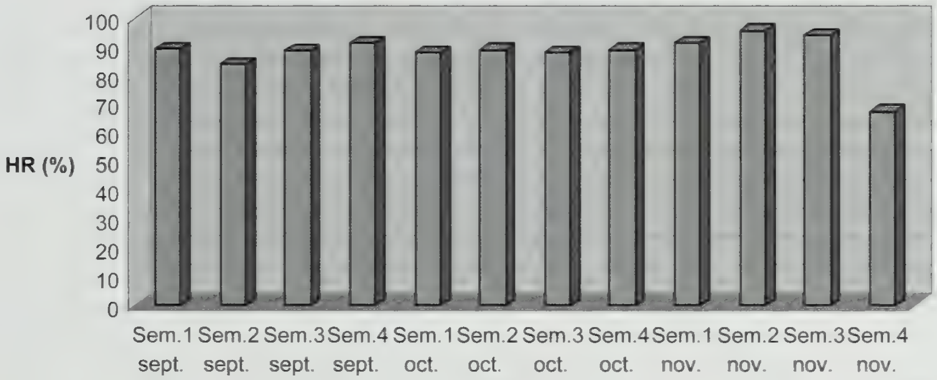


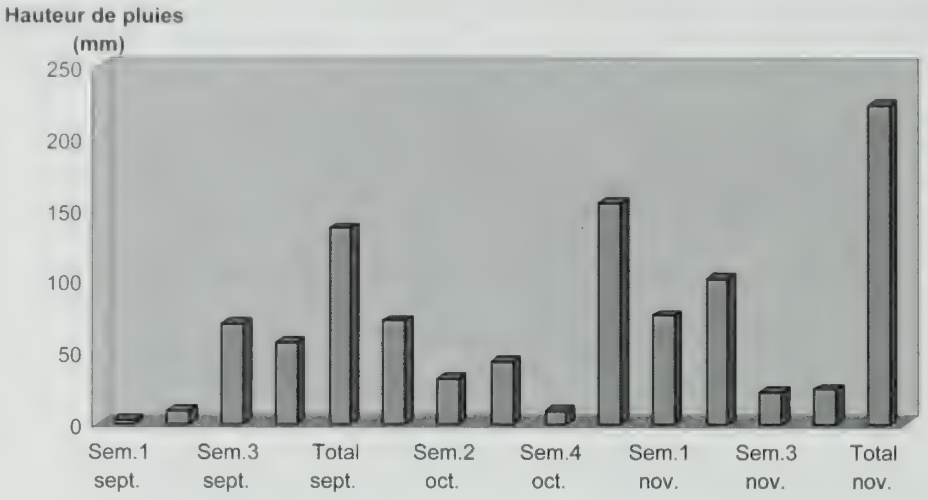
Figure 3 : Evolution de l'humidité relative moyenne (sept-oct-nov)



Le mois de novembre est celui qui présente l'écart de température le plus élevé (7,6°C) tandis que septembre et octobre présentent des écarts de température faibles (2,2°C pour septembre et 0,8°C pour octobre). Tout comme la température, le mois de novembre connaît des fluctuations importantes de l'humidité relative (67,5% à 95,5%, soit un écart d'humidité relative de 28%), contrairement aux mois de septembre et octobre pour qui ces valeurs sont presque constantes ; les écarts d'humidité relative étant de 7,3% en septembre et de 0,7% en octobre.

Le mois le moins pluvieux est septembre (hauteur totale des pluies = 137mm) ; les mois les plus arrosés sont octobre et novembre où on note respectivement 155mm et 235,5 mm de pluie (Fig. 4).

Figure 4 : Variation de la pluviométrie (sept-oct-nov)



1.5 Espèces étudiées

Il s'agit des escargots *Achatinidae* présents dans le Parc National du Banco. Les récoltes réalisées de septembre à novembre 2003 ont permis de récolter à l'intérieur du PNB, sept espèces d'escargots terrestres (Figs 5 à 11). Ce sont *Achatina achatina* (Linné, 1758), *A. fulica* (Bowdich, 1822), *Archachatina marginata* (Swainson, 1821), *A. marginata var. albinos*, *A. ventricosa* (Gould, 1850), *Lignus intertinctus* (Gould, 1843) et *Limicolaria flammea* (Müller, 1774).

2. Méthodes

2.1 Etablissement des transects

Ce sont des surfaces de 20 000 m^2 (200m / 100m) délimitées à différents endroits à l'intérieur du parc et sur lesquelles on réalise les échantillonnages. L'établissement des transects tient compte d'un certain nombre de critères dont l'accessibilité au site (présence de cours d'eau, de bas-fond ou de colline, de zone inondée, densité de la forêt), la physionomie du couvert végétal (type de canopée et épaisseur de la litière), le type de sol (sol sableux, argileux ou sol noir de forêt) et le degré de destruction ou de perturbation de la forêt (action anthropique). Ces critères nous ont permis de délimiter à divers endroits à l'intérieur de la forêt dix transects dénommés T1 à T10 (Fig. 1).

2.2 Echantillonnage

L'étude consiste à effectuer des sorties diurnes et nocturnes sur les transects et à faire des ramassages de spécimens vivants et de coquilles vides (qui représentent des traces de présence). A chaque sortie, on relève les paramètres climatiques du milieu prospecté à savoir la température, l'humidité relative, la pluviométrie. Pour chaque spécimen rencontré, on détermine les paramètres biotiques (longueur de coquille, poids vif, état physiologique de l'animal c'est-à-dire vie active ou vie ralentie, aspect de la coquille). Nous nous intéressons également à certains paramètres édaphiques tels que la texture du sol (sol sableux, argileux, limoneux, argilo-sableux), l'épaisseur de la litière et le degré d'humidité du sol. Une fois les mesures effectuées, le spécimen est marqué et remis dans le milieu pour une éventuelle recapture.

Il est important de préciser que nous effectuons deux sorties par mois, chacune d'elles dure 3 jours. Au cours de ces sorties, on effectue 2 heures d'échantillonnage diurne et 2 heures d'échantillonnage nocturne par transect, soit au total 4 heures d'échantillonnage toutes les deux semaines. Ce qui revient à un total global de 8 heures d'échantillonnage par transect et par mois, donc un total de 8 x 3 soit 24 heures d'échantillonnage par transect au cours de ces trois mois (septembre-octobre-novembre).

2.3 Identification de l'espèce

On pourra identifier avec précision l'escargot à partir de la taille et le poids à l'âge adulte, de l'ornementation de la coquille, de la forme de l'apex, de l'aspect de la suture, de l'ouverture de la columelle, de la bordure coquillière et de la couleur de la chair (Abbott, 1989; Hardouin et al., 1995). D'autre part, Mead (1950 ; 1979) a souligné que l'identification de l'espèce pouvait être menée par examen du tractus génital de spécimens sexuellement matures.

Quatre caractéristiques essentielles permettent de distinguer le genre *Achatina* du genre *Archachatina*, ce sont :

- la forme de l'apex : celui de *Achatina* est pointu, tandis que *Archachatina* possède un apex beaucoup plus émoussé ; Codjia et Noumonvi (2002) précisent la présence d'une bordure coquillière chez les *archachatines* .

- La présence d'un "V" sur la queue : il s'agit d'une sorte de repli dentelé bien marqué et situé sur la queue des *archachatines*.

- la "texture" de la peau : *Archachatina* présente sur sa peau de nombreux petits pores très serrés les uns aux autres, contrairement à *Achatina* chez qui les pores sont plus gros et moins nombreux.

- La taille des œufs : *Achatina* a de petits oeufs (4-10 mm de diamètre) avec environ 20 à 400 oeufs par ponte, tandis que *Archachatina* possède de grands œufs (12-20 mm) avec 6 à 20 oeufs par ponte.

Parmi les archachatines présentes dans la forêt classée du Banco, nous avons répertoriés :

- *Archachatina marginata* (Fig. 8) qui présente sur sa coquille de nombreuses stries verticales, des lignes en zig zag et des tâches brun noisette à brun pâle. La columelle et la cloison pariétale sont blanc à blanc bleu.
- *Archachatina marginata* var. albinos (Fig. 9) présente pratiquement les mêmes caractéristiques que *A. marginata,* à la seule différence que cette espèce possède une chair blanche.
- *Archachatina ventricosa* (Fig. 7) est ventrue et présente sur sa coquille de nombreuses stries verticales, des lignes en zigzag et des taches verdâtres. (Hodasi, 1984 ; Otchoumou, 1991).

Concernant les achatines présentes dans la forêt classée du Banco, nous avons répertoriés :

- *Achatina achatina* (Fig. 5) qui présente sur sa coquille des bandes sombres en zigzag sur fond marron.
- *Achatina fulica* (Fig. 6) qui possède une coquille effilée avec des bandes sombres en zigzag sur fond marron. (Hodasi, 1984 ; Otchoumou, 1991 ; Zongo et al., 1990).Quant à *Lignus intertinctus* (Fig. 10) et *Limicolaria flammea* (Fig. 11), ce sont des escargots de petite taille, soit respectivement en moyenne 6-8cm et 4,5 cm de longueur. La coquille *de L. intertinctus* possède des couleurs variées : jaune pâle, noir, noir et blanc et rose ; son corps possède une longueur qui est 2 ou 3 fois supérieure à sa coquille. Celle de *L. flammea* est marron clair et parsemée de bandes sombres disposées longitudinalement.

2.4 Expression des résultats et analyses statistiques

Les effectifs des individus échantillonnés ont fait l'objet d'une évaluation de l'indice de diversité de Shannon (Ish) et de la densité. Les valeurs moyennes de poids vif et de longueur de coquille ont été quant à elles soumises à une analyse de la variance.

L'expression de l'Ish est la suivante (Raybaud, 2005) :

$$\mathbf{Ish = - \sum p_i \log_2 p_i} \qquad \text{avec } i = 1 \text{ à } S$$

- $p_i = n_i/N$ est la fréquence relative pour l'espèce i, c'est-à-dire la probabilité d'apparition de l'espèce i (n_i) sur le nombre total d'individus (N).
- S est le nombre d'espèces.

Le logiciel EXCEL a permis d'évaluer cette diversité spécifique. Quant au degré d'homogénéité des espèces étudiées, il a pu être apprécié grâce au logiciel STATISTICA à travers une analyse de la variance.

3. Résultats

3.1 Liste des escargots terrestres rencontrés, potentiel (abondance) et taille

Le tableau 1 donne les effectifs, fréquences et paramètres biotiques des espèces d'*Achatinidae* présentes dans le Parc National du Banco.

Tableau 1 : Noms, potentiel (abondance) et taille des espèces d'*Achatinidae* du PNB

		Poids vif				Longueur coquille			
Espèces rencontrées	**Effectifs**	**Moyennes**	**Variance**	**Ec-Type**	**Erreur-T**	**Moyennes**	**Variance**	**Ec-Type**	**Erreur-T**
Achatina achatina	33	166,48	1998,38	44,70	7,78	110,42	176,44	13,28	2,31
A. fulica	43	45,12	2355,42	48,53	7,40	64,63	871,43	29,52	4,50
Archachatina Ventricosa	24	179,08	638,60	25,27	5,16	110,17	197,71	14,06	2,87
A. Marginata	3	252,00	4,00	2,00	1,15	123,33	2,33	1,53	0,88
A. marginata var. albinos	6	309,50	5,50	2,35	0,96	143,50	1,10	1,05	0,43
Lignus intertinctus	33	8,23	46,26	6,80	1,18	38,30	96,59	9,83	1,71
Limicolaria flammea	6	3,48	0,03	0,17	0.07	32,17	0,87	0,93	0.38
Total	148	98,90	8645,09	92,98	7.64	79,43	1451,21	38,09	3,13

Effets significatifs marqués à $p < .05000$

Ainsi les espèces les plus abondantes sont *Achatina fulica* (43 spécimens échantillonnés, soit 41,75 %), *A. achatina* (avec 33 spécimens échantillonnés, soit 32,04 %), *Lignus intertinctus* (33 spécimens échantillonnés, soit 32,04 %) et *Archachatina ventricosa* (24 specimens échantillonnés, soit 23,3 %). Par ailleurs, les valeurs de poids vifs moyens (> 160 g) et de longueur de coquille (>110 mm) sont relativement élevées pour toutes les espèces rencontrées.

Enfin, les valeurs de variance et d'écart type calculés ($p < .05000$) pour les espèces *Archachatina marginata*, *A. marginata var. albinos* et *Limicolaria flammea* sont très faibles (< 6 pour le poids vif et < 2 pour les longueurs de coquille), comparées aux autres espèces *Achatina fulica*, *A. achatina*, *Archachatina ventricosa* et *L. intertinctus*, dont les valeurs sont nettement élevées.

3.2 Distribution temporelle des différentes espèces d'escargots terrestres

Le tableau 2 résume l'influence du climat sur la répartition de ces espèces.

Tableau 2 : Répartition des espèces d'*Achatinidae* en fonction du temps

	Septembre		**Octobre**		**Novembre**	
Espèces rencontrées	**Effectif**	**Ish**	**Effectif**	**Ish**	**Effectif**	**Ish**
Achatina achatina	10	0,42	11	0,46	12	0,53
A. fulica	12	0,46	27	0,51	4	0,39
Archachatina ventricosa	14	0,48	7	0,38	3	0,33
A. marginata	3	0,21	0	...	0	...
A. marginata var. albinos	1	0,10	1	0,10	4	0,39
Lignus intertinctus	16	0,50	10	0,44	7	0,49
Limicolaria flammea	6	0,33	0	...	0	...
Total	62	**2,51**	56	**1,89**	30	**2,13**

On a dénombré beaucoup plus de spécimens en septembre (62 individus/mois) et en octobre (56 individus/mois), contrairement au mois de novembre (30 individus/mois). De plus, l'indice de diversité de Shannon (Ish) est plus élevé en septembre (2,51), contre 2,13 en novembre et 1,89 en octobre.

3.3 Influence du biotope sur la distribution des espèces

Le tableau 3 résume l'influence du biotope sur la répartition des *Achatinidae*.

Tableau 3 : Répartition des espèces d'*Achatinidae* en fonction du biotope

	Forêt non anthropisée		**Forêt faiblement anthropisée**		**Forêt fortement anthropisée**	
Espèces rencontrées	**Effectif**	**Densité (nb. d'ind./ha)**	**Effectif**	**Densité (nb. d'ind./ha)**	**Effectif**	**Densité (nb. d'ind./ha)**
Achatina achatina	9	4,5	15	7,5	9	4,5
A. fulica	0	0	6	3	37	18,5
Archachatina ventricosa	16	8	7	3,5	1	0,5
A. marginata	0	0	0	0	3	1,5
A. marginata var. albinos	0	0	0	0	6	3
Lignus intertinctus	15	7,5	10	5	8	4
Limicolaria flammea	0	0	0	0	6	3
Total	40	**20**	38	**19**	70	**35**

Il ressort de ce tableau que la majorité des espèces échantillonnées colonise les milieux anthropisés. C'est le cas de *Achatina achatina* (densité = 7,5 individus/ha en milieux faiblement anthropisés et 4,5 individus/ha en milieux fortement anthropisés) et *A. fulica* (densité = 3 individus/ha en milieux faiblement anthropisés et 18,5 individus/ha en milieux fortement anthropisés). Par contre *Archachatina ventricosa* (densité = 8 individus/ha) et *Lignus intertinctus* (densité = 7,5 individus/ha) se rencontrent en grand nombre dans les milieux non anthropisés, caractérisés par une canopée fermée et une litière très épaisse.

3.4 Distribution des espèces en fonction du substrat

Le tableau 4 présente l'influence du substrat sur la répartition des *Achatinidae*.

Tableau 4 : Répartition des espèces d'*Achatinidae* en fonction du type de substrat

	sur sol ou sur la litière		**à l'intérieur de la litière**		**sur tronc mort couché**		**sur feuilles d'arbustes**		**sur branches d'arbustes**	
Espèces rencontrées	**Effectif**	**Ish**	**Effectif**	**Ish**	**Effectif**	**Ish**	**Effectif**	**Ish**	**Effectif**	**Ish**
Achatina achatina	30	0,52	2	0	1	0,5	0	...	0	...
A. fulica	10	0,33	0	...	0	...	3	0,28	0	...
Archachatina ventricosa	2	0,11	0	...	1	0,5	20	0,51	1	0,53
A. marginata	3	0,15	0	...	0	...	0	...	0	...
A. marginata var. albinos	6	0,24	0	...	0	...	0	...	0	...
Lignus intertinctus	13	0,38	0	...	0	...	18	0,52	2	0,39
Limicolaria flammea	6	0,24	0	...	0	...	0	...	0	...
Total	100	**1,99**	2	**0**	2	**1**	41	**1,31**	3	**0,92**

On note que le biotope préférentiel de la majorité des escargots terrestres est le sol ou la litière (effectif = 100 ; Ish = 1,99). Néanmoins, certaines espèces comme *Lignus intertinctus, Archachatina ventricosa* et parfois *Achatina fulica* s'observent souvent sur les troncs d'arbres, les branches ou les feuilles des arbustes.

3.5- Taux ou pourcentage de recapture

Durant les trois mois d'échantillonnage, aucun spécimen marqué n'a été recapturé.

Discussion

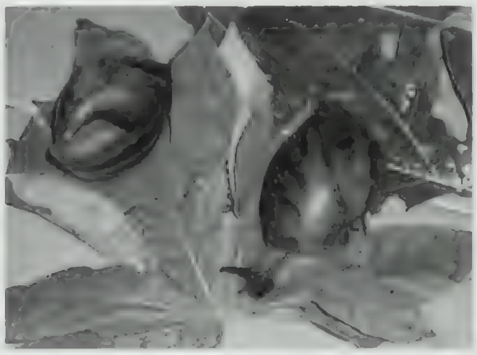
La présence de ces espèces d'*Achatinidae* au sein du Parc National du Banco peut laisser supposer que cette forêt représente un milieu de vie favorable pour elles.

Les effectifs obtenus montrent que parmi les espèces rencontrées, *Achatina achatina, A. fulica, Archachatina ventricosa* et *Lignus intertinctus* sont les plus nombreuses. Cela pourrait laisser supposer que le milieu étudié réunit à cette période de l'année (septembre à novembre) les meilleures conditions de vie active. Et ces conditions apparaissent précisément aux mois de septembre et octobre où règnent une température moyenne de 25,7°C à 27,9°C, une humidité relative moyenne allant de 83,8% et 91,2% et une hauteur totale de pluie de 137 mm (septembre) et 155 mm (octobre). Cela semble s'accorder avec les résultats de Takeda et Ozaki (1986) qui étudiant *A. fulica*, ont montré que cette espèce avait une activité essentiellement nocturne et que cette activité était induite par une humidité relative de l'air au moins supérieure à 50 % et des températures comprises entre 18 et 30°C, induisant l'activité locomotrice.

Les poids vifs et longueurs de coquille mesurés, de même que les valeurs de variance et d'écart type calculés montrent que les populations étudiées sont majoritairement d'âge adulte et sub-adulte et présentent des degrés d'homogénéité variés. En effet, pour *Archachatina marginata, A. marginata var. albinos* et *Limicolaria flammea*, les échantillons sont dits très homogènes. En d'autres termes, les individus de chacune de ces espèces présentent pour la période considérée (septembre à novembre) à peu près les mêmes poids vif et longueur de coquille. Cela pourrait s'expliquer par le fait que ces espèces possèdent une seule et courte saison (environ 12 à 16 mois) de reproduction dans l'année. Pour *Achatina achatina, Archachatina ventricosa* et *Lignus intertinctus*, les échantillons récoltés sont simplement dits homogènes. Autrement dit, les individus de ces espèces présentent une variation de poids vif et de longueur de coquille pas très significative et qu'on pourrait lier à une seule mais longue saison de reproduction (18 à 21 mois) (Otchoumou, 1991). Chez *A. fulica* par contre, les fortes valeurs de variance et d'écart type montrent qu'il s'agit de population hétérogène, c'est-à-dire que les individus présentent une variation significative de taille et de poids vif, liée probablement à deux ou plusieurs saisons de reproduction. Cela semble évident d'autant plus que cette espèce est la plus prolifique de toutes les espèces rencontrées (Otchoumou et al. 2003).

Le fait que *Achatina achatina, Archachatina ventricosa* et *Lignus intertinctus* présentent une densité relativement élevée en forêt faiblement anthropisée (pour *A. achatina)* et non anthropisée (pour *A. ventricosa* et *Lignus intertinctus)*, pourrait signifier que ces animaux recherchent perpétuellement un microclimat favorable à leur reproduction et leur croissance. Par contre *Achatina fulica* et *Limicolaria flammea* ne sont pas très exigeantes et préfèrent les zones fortement dégradées par les activités humaines (De Winter, 1985 ; Otchoumou et al., 2005)

Enfin, il est important de rappeler que pour des conditions climatiques identiques, presque toutes les espèces d'escargots préfèrent le sol ou la litière, comme le témoigne l'Ish calculé (1,99). On pourrait lier cela à la recherche de substrat humide. D'autre part, il faut préciser que les escargots recherchent dans le sol des minéraux et notamment le calcium et le fer indispensables à leur croissance et leur maturation. Concernant les espèces semi arboricoles (cas de *Lignus intertinctus, Archachatina ventricosa* et parfois *Achatina fulica*), la recherche de la fraîcheur pourrait prédominer sur celle des sols humides, de même que la recherche de bourgeons ou de feuilles tendres pour l'alimentation.La raison pour laquelle aucun spécimen marqué n'ait été recapturé pourrait s'expliquer par le fait que le marquage utilisé s'est effacé dans le temps. En effet nous avons utilisé un marquage coquillier au moyen d'encre indélébile. Mais cela ne semble pas présenter une persistance suffisante. Il serait souhaitable et préférable d'avoir recours à d'autres types de marquage indélébile. Stievenart (1993) propose la gravure coquillière qui consiste en l'élimination mécanique ponctuelle de matériau coquillier. Toutefois cette méthode reste traumatique. Une autre méthode, la gravure chimique, qui consiste en la dissolution de la partie colorée de l'ostracum au moyen d'HCl fumant (à 37%) n'est également pas dénuée de risques, mais peut être appliquée moyennant quelques précautions d'usage sur des escargots géants africains ayant terminé leur croissance .



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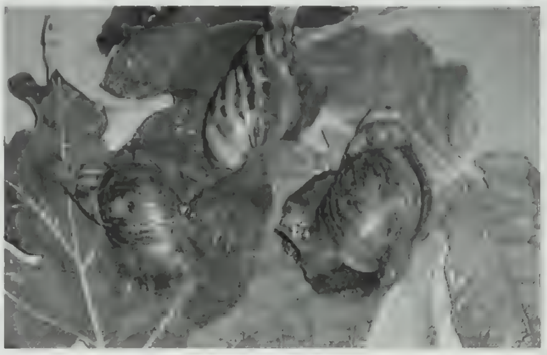

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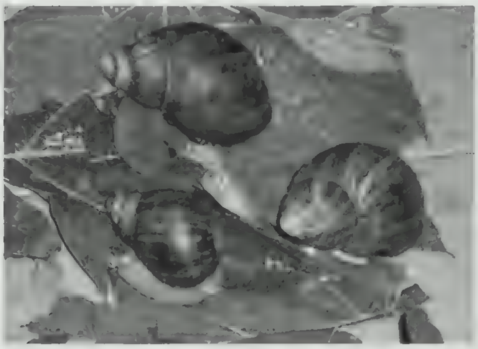

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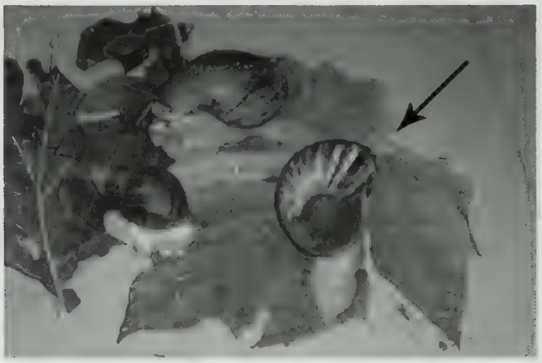

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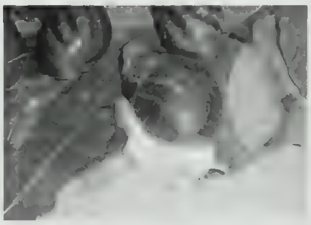

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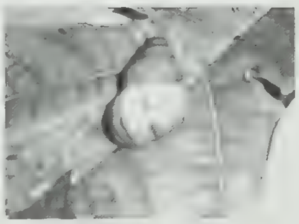

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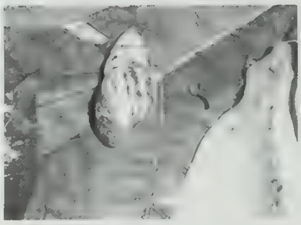

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Figures 5-11

5. *Achatina achatina* (Linné, 1758); **6.** *Achatina fulica* (Bowdich, 1822); **7.** *Archachatina ventricosa* (Gould, 1850); **8.** Droite: *Archachatina marginata* (Swainson, 1821); **9.** *Archachatina marginata* (var. albinos); **10.** *Lignus intertictus* (Gould, 1843); **11.** *Limicolaria flammea* (Müller, 1874)

Conclusion

Cette étude nous a permis de savoir qu'en plus des espèces d'escargots comestibles et communes que sont *Achatina achatina*, *A. fulica* et *Archachatina ventricosa*, il existe d'autres espèces moins communes également comestibles, et qui occupent une part importante dans l'alimentation de nos populations, surtout lagunaires. C'est le cas de *Lignus intertinctus* et *Limicolaria flammea*.

D'autre part, les escargots, bien qu'attirés par l'humidité, ne présentent pas le même degré d'attirance pour l'eau. Au regard des aires de distribution actuellement connues, les escargots *Limicolaria flammea* et *Achatina fulica* semblent pouvoir se reproduire dans des régions trop sèches pour *A. achatina* ou pour *Archachatina marginata var. albinos* (Hardouin et al., 1995).

On retiendra au terme de cette étude que le Parc National du Banco (PNB), bien qu'ayant subi par endroits de nombreuses perturbations anthropiques, reste et demeure un patrimoine à intérêt écologique certain de par sa biodiversité.

De nombreuses espèces végétales et animales font la fierté de cette forêt. Parmi ces dernières, on ne peut s'empêcher de citer les escargots *Achatinidae* chez qui la grande biodiversité spécifique et la forte richesse en protéines exigent que des mesures de prévention soient prises par les autorités politiques pour que la récolte des spécimens par les populations riveraines soit réglementée adulte (par exemple pour *Achatina achatina*, il faudrait limiter la récolte aux spécimens dont la longueur de coquille excède 80 mm). Pour cela, des campagnes de sensibilisation doivent être envisagées et si possible il faudrait procéder à des mini élevages aux alentours du parc.

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NOTE AUX AUTEURS

Conditions Générales. L'affiliation à la Société n'est pas obligatoire pour les auteurs. La publication des articles de maximum 12 pages imprimées en double interligne est gratuite. Au-delà de 12 par numéro, chaque page sera facturée au prix de 40,00 €. Les articles de taille supérieure peuvent être scindés sur plusieurs numéros.

Les numéros hors série sont publiés irrégulièrement. Les auteurs désireux de soumettre un article pour un numéro hors série (40 pages imprimées ou plus) sont priés de contacter auparavant la Société Belge de Malacologie à l'adresse ci-dessous.

Les articles décrivant de nouvelles espèces (sous-espèces) ne seront acceptés que si le matériel type primaire est déposé dans un Musée ou une Institution scientifique publique.

Les auteurs devront suivre strictement les règles du *Code de Nomenclature Zoologique* (quatrième édition).

Manuscrits. Les manuscrits seront rédigés en français ou en anglais. Ils doivent être dactylographiés, justifiés à gauche, avec double interligne, sur une seule face de papier A4 et sur une colonne. Les marges doivent être de 25 mm minimum. La séquence des sections respectera l'ordre suivant : titre, nom de(s) auteur(s), adresse(s) de(s) auteur(s), mots-clés et résumé en anglais (et éventuellement en français). Les noms de genre et des (sous) espèces seront en caractères *italiques*. Les références dans le texte auront la forme: Keen & Campbell (1964) ou (Keen & Campbell, 1964). **Consultez un numéro récent de Novapex pour l'organisation du texte.**

La liste des références, en ordre alphabétique, respectera la forme suivante (les titres des publications ne devraient pas être abrégés):

Keen, A.M. & Campbell, G.B. 1964. Ten new species of Typhinae (Gastropoda : Muricidae). *TheVeliger* 7(l): 46-57.

Powell, A.W.B. 1979. *New Zealand Mollusca. Marine, land and freshwater shells.* William Collins Publishers Ltd: xiv + 500 pp.

Mayr, E. 1989. Attaching names to objects. In: *What the philosophy of biology is : essays for David Hull* (M. Ruse, ed.), Klumer Academic, Dordrecht: 235-243.

Illustrations. Les photographies doivent être de bonne qualité (couleur ou noir/blanc), imprimées sur papier brillant et montées sur un support adéquat dans le format final souhaité (max. 16 X 21 cm). Des photographies en couleur peuvent être soumises pour une reproduction en noir et blanc. Les illustrations peuvent également être fournies sur un support informatique (CD-ROM, ZIP) en format BMP, JPG ou TIFF avec mention du programme utilisé. Elle doivent être montées et ne peuvent contenir aucun texte, sauf la numérotation. Une version imprimée des planches doit être impérativement jointe au manuscrit.

L'inclusion de planches couleurs est soumise à l'approbation du conseil d'administration qui prendra la décision finale. Les auteurs désireux d'inclure une ou plusieurs planches couleurs sont priés de se renseigner quant aux possibilités offertes et aux coûts.

Traitement des manuscrits. Les manuscrits seront soumis au conseil d'administration qui distinguera les articles d'intérêt scientifique et ceux d'intérêt général. Les décisions et les commentaires seront communiqués aux auteurs, qui en tiendront compte. La version corrigée devra être renvoyée à la Société Belge de Malacologie sous forme informatisée (en Word pour Windows) accompagnée d'un tirage sur papier. Elle devra respecter strictement les instructions de mise en page qui auront été communiquées aux auteurs. Une épreuve finale sera renvoyée aux auteurs pour correction.

Tirés-à-part. En ce qui concerne les articles d'intérêt scientifique, 30 exemplaires sont gratuits, jusqu'à concurrence de 240 pages maximum, si au moins un des auteurs est membre de la Société. Les exemplaires supplémentaires (min. 30 exemplaires) seront facturés au prix coûtant.

Pour les non membres, les tirés-à-part sont à charge des auteurs, au prix coûtant (minimum 30 exemplaires). Les frais de port sont toujours à charge des auteurs.

Les manuscrits, les épreuves corrigées et toute correspondance seront adressés à:
Société Belge de Malacologie, M. R. Houart, B.P. 3, B-1370 Jodoigne, Belgique.

NOTE TO AUTHORS

General conditions. Membership is not mandatory for authors. Publication of papers with a maximum of 12 double spaced printed pages is free of charge. Beyond 12, every page will be invoiced at the price of 40,00 €. Larger papers may be splitted on several issues.

Supplements are published irregularly. Authors wishing to submit papers for supplements (40 printed pages or more) are asked to contact the board previously at the address mentioned below.

Papers describing new species (subspecies) will be accepted only if the primary types are deposited in a recognized public Museum or scientific Institution.

The paper will be in accordance with the rules of the *International Code of Zoological Nomenclature* (Fourth edition)

Manuscripts. Manuscripts will be in English or in French. They must be typed on one column, ragged right (left-justified), double-spaced throughout, on one side only of A4. Margins must be at least 25 mm. The sequence of sections will respect the following order: title, name of author(s), address(es) of author(s), keywords and summary in English. Generic and (sub)specific names have to be typed in *italics*. References in the text should be given as follows: Keen & Campbell (1964) or (Keen & Campbell, 1964) **Refer to a recent issue of Novapex for the lay out.**

References, in alphabetic order, should be given in the following form (titles of journals should not be abbreviated):

Keen, A.M. & Campbell, G.B. 1964. Ten new species of Typhinae (Gastropoda : Muricidae). *TheVeliger* 7(l): 46-57.

Powell, A.W.B. 1979. *New Zealand Mollusca. Marine, land and freshwater shells.* William Collins Publishers Ltd: xiv + 500 pp.

Mayr, E. 1989. Attaching names to objects. In: *What the philosophy of biology is : essays for David Hull* (M. Ruse, ed.), Klumer Academic, Dordrecht: 235-243.

Illustrations. Photographs must be of a high quality (colour or black/white), printed on glossy paper in a final version (max. 16 X 21 cm), adequatly mounted. Colour work can be submitted for black & white production. The illustrations may be submitted as digital files (CD-ROM, ZIP) in BMP, JPG or TIFF format, with mention of the program. They must be adequately mounted with not any other text than the numbering. A printed version of the plates must be imperatively sent together with the manuscript. Inclusion of colour plates has to be approved by the board who will take the final decision. Authors who want to include colour plates are invited to ask for possibilities and charges.

Processing of manuscripts. Manuscripts will be submitted to the board who will distinguish between the articles of scientific interest, and those of general aim. The comments will be communicated to authors, who will consider them. A diskette containing the corrected version should be sent back to the Belgian Malacological Society (in Word for Windows support) together with a printed copy. It should strictly follow the style instructions which will be communicated to the author(s).

Reprints. With regard to papers of scientific interest, 30 reprints are free of charge, representing a maximum of 240 pages, if at least one author is member of the Society. Additional copies (at least 30) will be invoiced at cost.

For non-members, the reprints (min. order 30 copies) will be billed to the author(s). Mailing costs are always to be paid by authors.

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Société Belge de Malacologie, Mr. R. Houart, B.P. 3, B-1370 Jodoigne, Belgium.

Vie de la Société – Life of the Society

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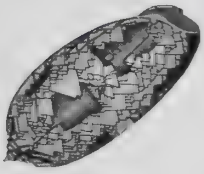
VIE DE LA SOCIETE LIFE OF THE SOCIETY



Prochaines activités de la SBM

Claude VILVENS

Lieu de réunion : Médiathèque de l'Institut St Joseph - Rue Félix Hap 14 - 1040 Bruxelles
à partir de 14h. *Sonnez et l'on vous ouvrira !*

ATTENTION ! *Nos activités peuvent nous emmener dans diverses salles (particulièrement pour des projections ou des montages audio-visuels). Il ne nous est donc plus possible d'ouvrir les portes à distance après 15H.*

SAMEDI 21 JUIN 2008

Etienne Meuleman : A la découverte des Ranellidae

Notre orateur s'éloigne encore une fois de ses Strombes et de ses mollusques dulcicoles. Il nous emmène cette fois à la découverte des Ranellidae. Nous survolerons les différentes espèces de cette famille (sans entrer dans le détail). Bien sûr, nous ne manquerons pas de faire le point sur les espèces fossiles et sur les usages des représentants de cette famille dans le quotidien des hommes à travers le monde. Encore un beau voyage en perspective au pays merveilleux des coquillages …

***

SAMEDI 6 SEPTEMBRE 2008

Tout le monde (coordination : Claude Vilvens & Edgar Waeingnier) : Le Clausiliidae Day de la SBM

Les Clausiliidae comptent parmi les mollusques terrestres qui sont les plus séduisants de par leur forme élégante et leur ouverture toute ciselée (mais aussi les plus mystérieux quant à leur détermination). L'objectif de cet atelier est le suivant : après un court exposé d'introduction, chaque participant à la réunion exposera quelques Clausiliidae du monde entier qu'il aura apportés. Nous mettrons d'abord d'accord pour sélectionner les plus beaux, les plus particuliers, les plus charmeurs. Pour quoi faire ? Pour ensuite élaborer la conception d'une poster format A3 qui s'intitulera "Clausiliidae du monde entier" (ou quelque chose du genre). Tous à vas collections ! Ce sera un travail d'équipe ☺ !

-- PUIS

La tradition sera aussi respectée, puisque la première réunion après les grandes vacances est celle de l'événement gastronomique de septembre. Pour entamer la rentrée dans la bonne humeur et nous raconter nos folles aventures de vacances (notamment celles du Président ou du Vice-président – un must !), nous vous proposons en effet de nous retrouver au traditionnel

banquet annuel de la SBM

qui débutera à 19h (voir annonce page 76 pour les détails).

***

SAMEDI 27 SEPTEMBRE 2008

Tout le monde : L'excursion d'automne de la SBM.

L'été se terminera, mais pas l'envie d'aller sur le terrain … Comme d'habitude, le choix de la zone que nous prospecterons n'est pas encore fixé – notre équipe de reconnaissance (= Claude et Etienne pour cette fois) va déterminer l'endroit après les grandes chaleurs espérées ...

Comme d'habitude aussi, le plus simple pour obtenir les dernières informations est de consulter notre site Internet (http://users.swing.be/sw216502/) ou encore de contacter quelques jours auparavant soit Claude (vilvens.claude@skynet.be ou 04/248.32.25), soit Roland (roland.houart@skynet.be ou 016/78.86.16). Comme d'habitude, il convient de prévoir d'emporter sa bonne humeur, un guide de détermination … et sans doute aussi bottes et vêtements de pluie (en principe, il fera magnifique, mais bon ;-) …).

***

SAMEDI 11 OCTOBRE 2008

David Monsecour: les Harpidae

Les membres de cette famille, assez peu peuplée au demeurant, sont connus pour être de véritables bijoux vivants. Tous leurs secrets vont nous être révélés ici !

***

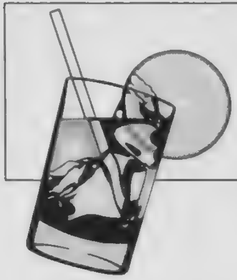
SAMEDI 8 NOVEMBRE 2008

Sophie Valtat: Les mollusques pélagiques

On sait que Sophie aime s'attaquer à des groupes de Mollusques assez peu connus – ce sera encore le cas cette fois, puisqu'elle nous emmène à la découverte des ces animaux au mode de vie surprenant. En fait, elle nous expliquera comment ces escargots marins se sont adaptés à la vie planctonique.

***

Réservez déjà dans vos agendas le 13 décembre 2008.

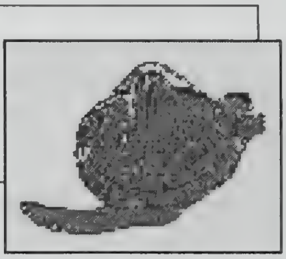


Banquet de la Société Belge de Malacologie

le samedi 6 septembre 2008 à 19h

au restaurant :

Le Rustique

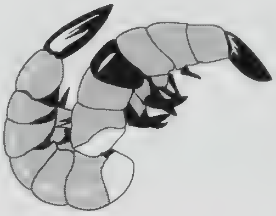


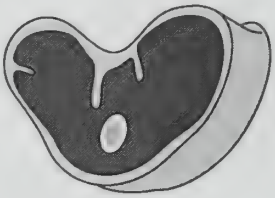
Avenue du Cimetière de Bruxelles, 155
1140 Evere

Comme d'habitude, les menus détaillés ne nous sont pas encore connus, étant donné qu'ils changent chaque mois. Cependant, le menu comprendra dans sa globalité :

- l'apéro et ½ bouteille de vin (blanc ou rouge);
- une entrée parmi 3 propositions;
- un plat principal parmi 3 propositions;
- dessert + café.

Extra à payer individuellement en supplément.





Prix : 35,00 €

Il est impératif de réserver afin que le restaurateur puisse nous réserver le meilleur accueil

Comment réserver ?

Pour le 29 août 2008, au plus tard, il convient de virer la somme correspondant au nombre de menus réservés au compte BBL : **310-1142433 – 53** de
Madame **Annie Langleit**, avenue Cicéron, 27/92 à 1140 – Bruxelles,
(pas de paiement à la SBM, s'il vous plaît !)

Nous nous réjouissons de vous rencontrer lors de cette joyeuse réunion !

Bonnes vacances à tous !!!

Pour les informations de dernière minute :

http://users.swing.be/sw216502/ ou http://www.sbm.be.tf

Novapex/Société : la publication généraliste de la SBM

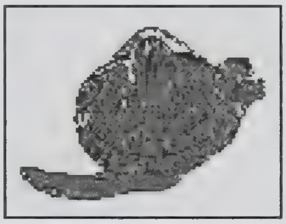
Rédacteurs en chef : Claude Vilvens et Etienne Meuleman

Tous les articles généraux sont les bienvenus pour Novapex/Société ☺ !

Afin de faciliter le travail de la Rédaction, il est vivement (et le mot est faible ;-)) souhaité de respecter les règles suivantes pour les articles proposés :

- document MS-Word (pour PC Windows 2000 ou XP);
- police de caractères Times New Roman;
- texte de taille 10, titres de taille 12;
- interligne simple;
- toutes les marges à 2,5 cm;
- document en une seule section;
- pas de mode colonne;
- photos en version électronique JPG.

Merci pour les Scribes ;-) ! N'hésitez pas à demander une page avec en-tête pour cadrer au mieux vos travaux (vilvens.claude@skynet.be).



Typhinellus labiatus (de Cristofori & Jan, 1832) dans l'estomac d'*Astropecten arantiacus* (Linnaeus, 1758) à Chypre Nord

Christiane DELONGUEVILLE
Avenue Den Doorn, 5 – B - 1180 Bruxelles - christiane.delongueville@skynet.be

Roland SCAILLET
Avenue Franz Guillaume, 63 – B - 1140 Bruxelles - scaillet.roland@skynet.be

Certaines astéries, comme *Astropecten arantiacus* (Linnaeus, 1758), sont de sérieux prédateurs de mollusques. En rampant sur le fond marin, elles évaginent l'estomac sur le sable et capturent ainsi, parmi d'autres invertébrés, des bivalves et des gastéropodes. Elles ramènent ces proies à l'intérieur du corps pour en digérer les parties molles avant de rejeter les coquilles dans le milieu extérieur. Précédemment, nous avions déjà mentionné que la dissection de l'estomac de ces échinodermes permettait la collecte de mollusques intéressants (Delongueville & Scaillet 2004). Une fois de plus cette technique de récolte s'est avérée productive.

En mai 2007, Lors d'un passage dans le port de pêche de Yenierenköy, situé sur la côte nord de la péninsule de Karpas (Chypre Nord), nous avons eu l'occasion de prélever dans un filet de pêche quelques spécimens d'*Astropecten arantiacus* (Fig. 1). L'un d'eux a été disséqué sur place. L'estomac contenait une coquille de *Typhinellus labiatus* (de Cristofori & Jan, 1832) (Fig. 2). Il s'agit d'un Muricidae à la sculpture très caractéristique, que l'on trouve de façon peu abondante dans l'ensemble de la Méditerranée. Le spécimen était déjà vidé, ou bien avait été avalé vide, car son opercule n'a pas été retrouvé dans l'estomac de l'astérie (Fig. 3-4).

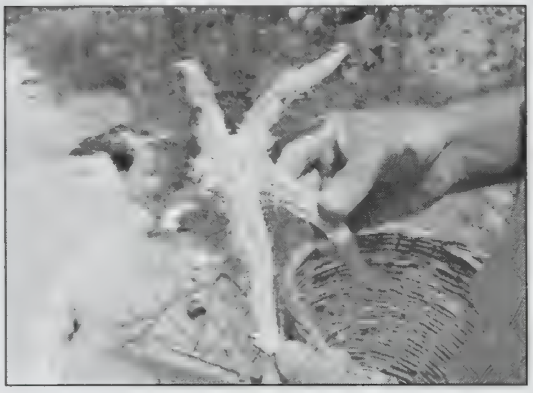


Fig. 1 ***Astropecten arantiacus*** **- Yenierenköy**

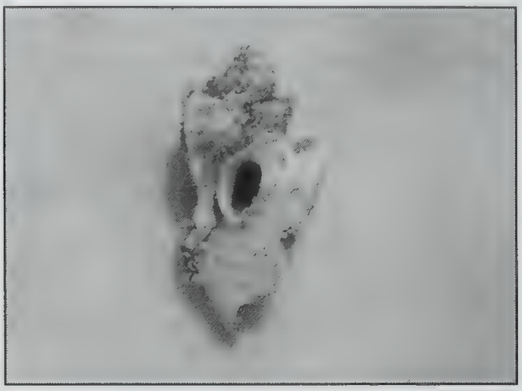


Fig. 2 ***Typhinellus labiatus*** **- Yenierenköy**

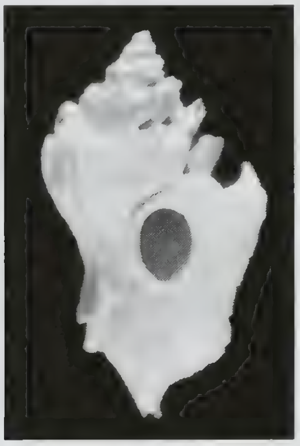


Fig. 3 ***Typhinellus labiatus*** **- Yenierenköy - 16,0 x 9,3 mm**

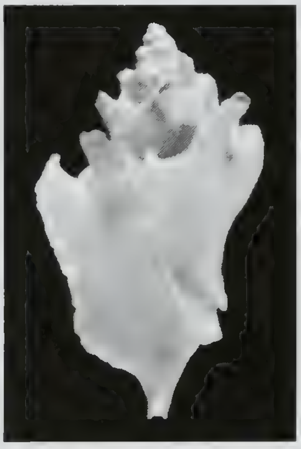
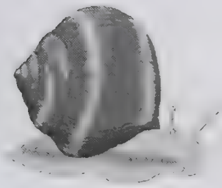


Fig. 4 ***Typhinellus labiatus*****- Yenierenköy - 16,0 x 9,3 mm**

REFERENCE

Delongueville, C. & Scaillet, R. 2004. Contenu stomacal d'Astropectinidae en Méditerranée. *Novapex / Société* 5(1):3-19.



Une initiative de la SBM : des fascicules sur les mollusques terrestres de Belgique pour un grand public naturaliste

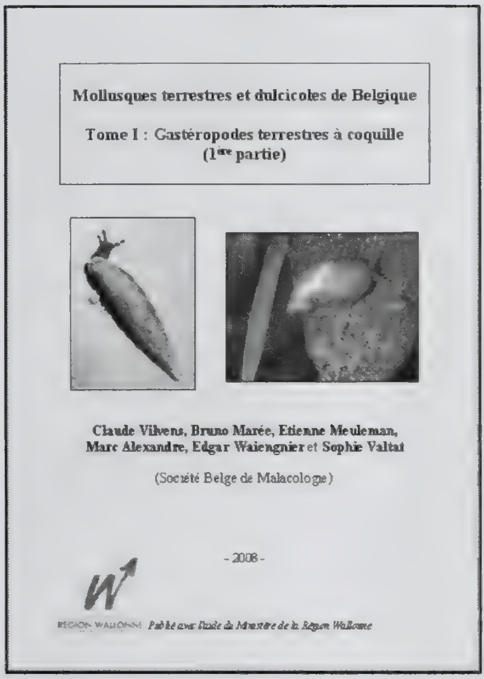
Claude VILVENS

La Société Belge de Malacologie est heureuse d'annoncer la parution de :

Mollusques terrestres et dulcicoles de Belgique

Tome I : Gastéropodes terrestres à coquille (1ère partie)
Tome II : Gastéropodes terrestres à coquille (2ème partie)

par **Claude Vilvens, Bruno Marée, Etienne Meuleman, Marc Alexandre, Edgar Waiengnier** et **Sophie Valtat**



Mollusques terrestres et dulcicoles de Belgique

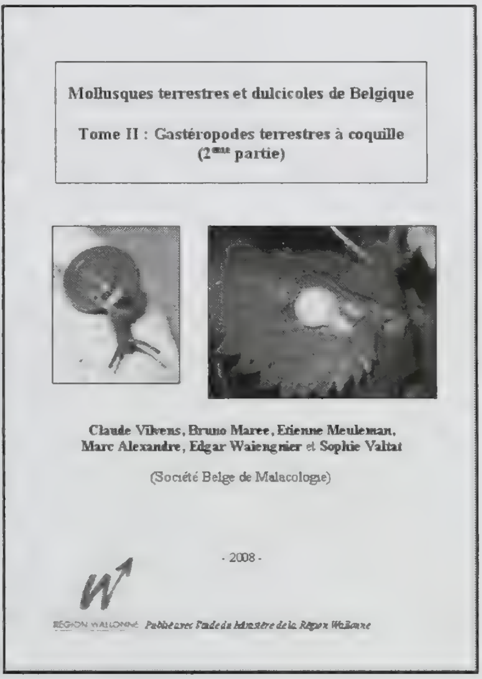
Tome I : Gastéropodes terrestres à coquille (1ère partie)

Claude Vilvens, Bruno Marée, Etienne Meuleman, Marc Alexandre, Edgar Waiengnier et Sophie Valtat

(Société Belge de Malacologie)

- 2008 -

RÉGION WALLONNE Publié avec l'aide du Ministère de la Région Wallonne



Mollusques terrestres et dulcicoles de Belgique

Tome II : Gastéropodes terrestres à coquille (2ème partie)

Claude Vilvens, Bruno Marée, Etienne Meuleman, Marc Alexandre, Edgar Waiengnier et Sophie Valtat

(Société Belge de Malacologie)

- 2008 -

RÉGION WALLONNE Publié avec l'aide du Ministère de la Région Wallonne

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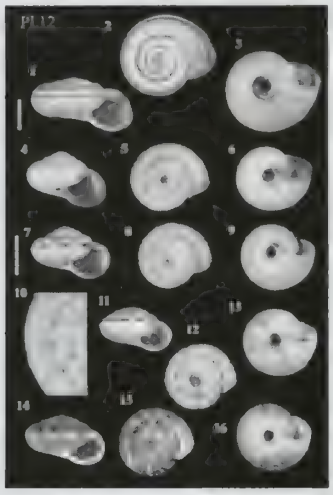
Ces deux ouvrages sont les deux premiers d'une série qui en comptera quatre. Elle constitue une introduction au monde des "escargots et limaces", tant ceux vivant dans le milieu terrestre (comme les jardins, les bois ou les dunes) que dans le milieu aquatique des rivières et étangs. Elle vise essentiellement les naturalistes spécialisés dans un domaine quelconque (comme par exemple l'ornithologie ou la botanique) et aussi le grand public intéressé par tout ce qui touche à la nature et au monde vivant.

Tout curieux de nature a déjà rencontré des escargots et des limaces, même si une grimace se fait immédiatement jour quand le jardinier pense à ses salades … Ces milieux "verts" se révèlent en fait bien plus riches en mollusques que l'on pourrait le croire : la "malacofaune" ne se limite pas aux familiers escargots jaunes à bandes foncées, à l'escargot de Bourgogne et à la grosse limace noire ou rouge. En fait, pour ne parler que des gastéropodes à coquilles, en inspectant les troncs ou les morceaux de bois mort, les dessous des pierres couvertes de mousse, les beaux rochers escarpés ou encore les amas de feuilles et autres débris végétaux (les "litières"), on peut découvrir des espèces très diverses d'"escargots" (en fait, des gastéropodes) : les "pointus" comme les Clausilies, les "microbes" comme les Vertigos, les "brillants" comme les Zonites, les "poilus" comme les Trichias ou les Helicodontas, etc.

Les auteurs des deux fascicules présentés ici, tous membres de la Société Belge de Malacologie (la science qui étudie les mollusques), ont voulu fournir des guides de terrain adaptés aux besoin de l'amoureux de la nature. Car il est un fait que les quelques rares guides d'identification existants sont en général trop riches, trop techniques, couvrent souvent une zone beaucoup plus vaste que la Belgique (en pratique toute l'Europe Occidentale tempérée), augmentant ainsi les risques de confusion lors de la détermination d'une espèce, et présentent les espèces étudiées uniquement sous forme de dessins, souvent d'ailleurs excellents, mais qui risquent de faire perdre une vue réelle de l'espèce pour un observateur non aguerri..

L'objectif est donc clairement de fournir un outil de détermination des mollusques que l'on peut être amené à rencontrer lors de ses balades naturalistes. Les auteurs ont donc choisi de réaliser un guide écrit en français, dans un langage accessible à un non spécialiste (donc sans termes trop techniques), avec un bon niveau taxonomique mais sans exagération pour les niveaux supérieurs, et illustré de photographies en couleurs (toujours de la coquille avec parfois des gros plans et aussi l'animal in situ), rendant ainsi l'ensemble utilisable sur le terrain. Pour chaque espèce rencontrée, la description est proposée selon un canevas immuable, avec, si nécessaire, des comparaisons avec les espèces similaires.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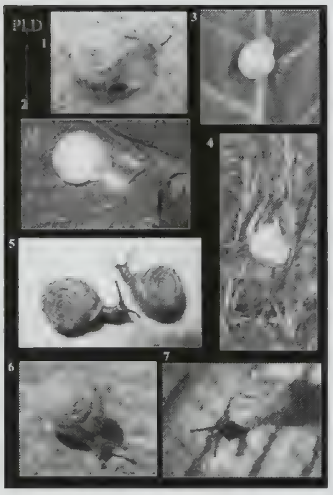
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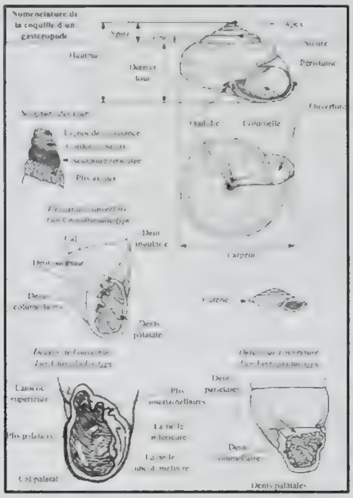
Nomenclature de la coquille d'un gastéropode
Apex
Spire
Suture
Hauteur
Dernier tour
Péristome
Ouverture
Ombilic
Columelle
Largeur
Dent angulaire
Carène
Dent columellaire
Dents palatale
Lamelle supérieure
Plis palatals
Cal palatal
Plis interlamellaires
Dent pariétales
Dent columellaire
Dents palatales

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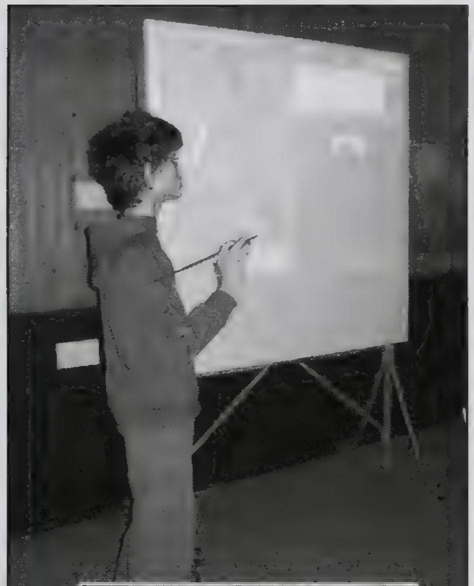
Très vite, les auteurs ont constaté que, même sans les mollusques marins, le sujet était bien trop vaste pour tenir dans un seul fascicule, ni même dans deux – du moins en tenant compte de nos impératifs d'impression qui visent un prix de vente raisonnable. Ceci a donc conduit à réaliser tout d'abord deux premiers tomes exclusivement consacrés aux gastéropodes terrestres à coquilles, reportant à un troisième tome les gastéropodes terrestres sans coquilles (donc les limaces) et à un quatrième les gastéropodes et bivalves d'eau douce. Ces tomes III et IV sont prévus pour fin 2008 ou début 2009

Leur travail a été dirigé vers un seul but : faire découvrir et apprécier leurs chers mollusques, tout comme le sont, par exemple, les oiseaux, les batraciens, les insectes, les fleurs ou les mousses … Il s'agit bien d'un monde étonnant et passionnant !

L'écho des réunions

Marc ALEXANDRE & Claude VILVENS

Réunion du 3 mars 2008 (CV) ➔ **Pierre Vilvens : Les mollusques dans la peinture.**

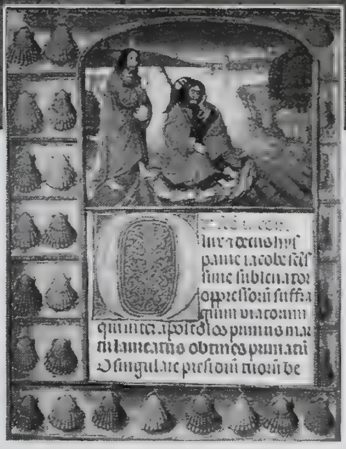


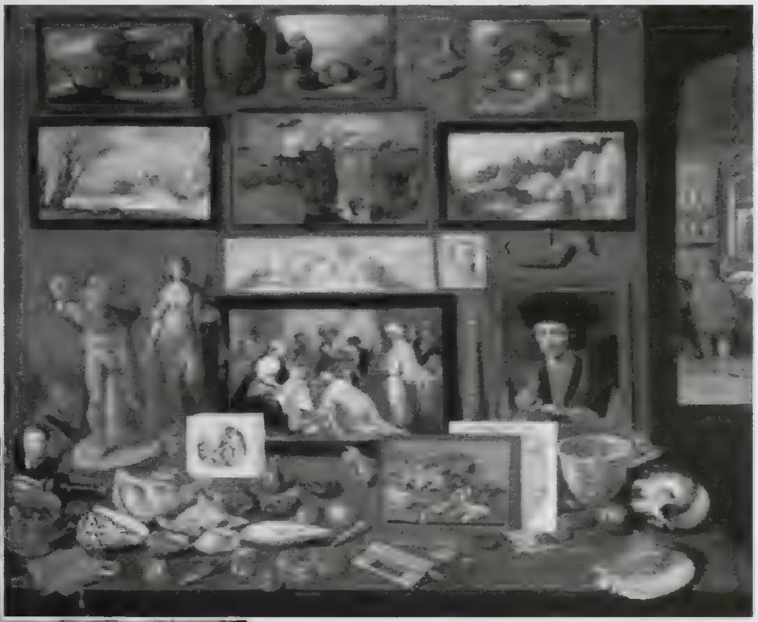
Ce fut donc un bien jeune orateur qui nous a entretenu des mollusques dans la peinture, au sens large d'ailleurs car les enluminures ou les affiches furent aussi de la fête.

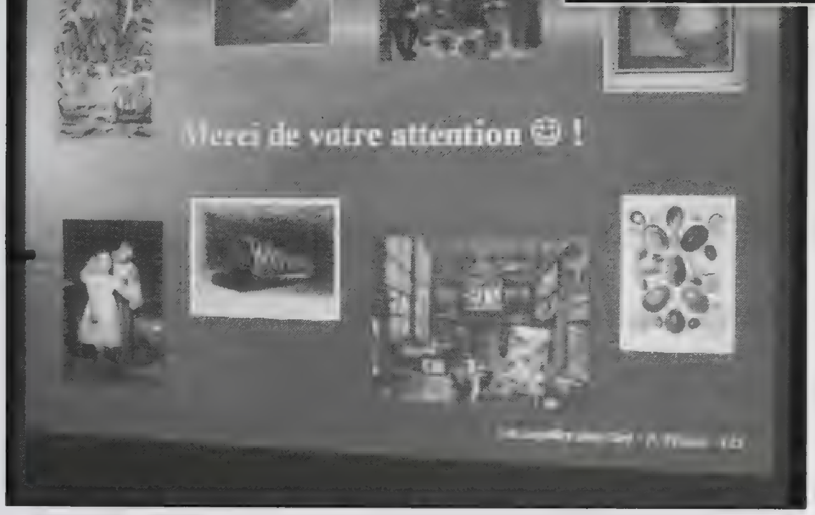
Il nous a emmené à travers l'Histoire (lignes du temps à l'appui), depuis l'Antiquité et le Moyen Age jusqu'à l' impressionismes, l'art nouveau puis le XXème siècle et le III millénaire, en passant par le Baroque, le Rococo et le Romantisme.

Bien sûr, de grandes classiques étaient au rendez-vous comme les coquilles Saint Jacques figurées au Moyen Age ou les cabinets d'amateurs de curiosités du XVIIème siècle. Mais Pierre a aussi traqué les coquillages et les escargots dans des œuvres où un regard distrait ne les auraient pas remarqués : une moule dans le Jardin des délices de Jérôme Bosch (v 1450-1516), diverses coquilles dans de nombreux tableaux de Frans Francken II (1581_1642), de Pierre-Paul Rubens (1577_1640), de Rembrandt (1606-1669) ou encore de Balthasar Van der Ast (1593_1656) et de James Ensor (1860-1949), enfin les caricatures et les affiches des XIXème et XXème siècle.

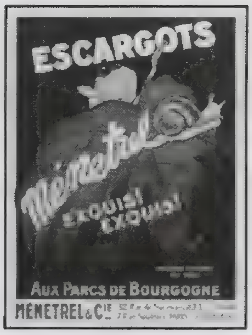
Un travail patient et méticuleux qui a passionné toute l'assistance !

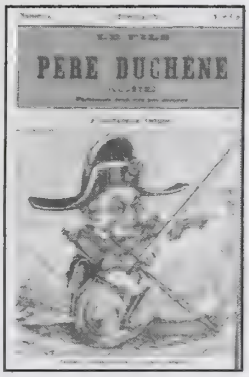




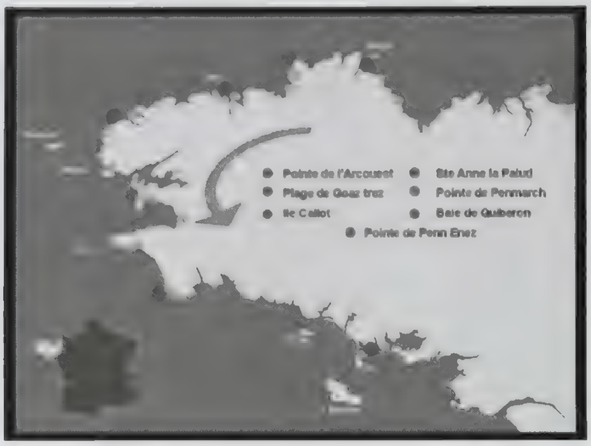


Merci de votre attention ☺ !





Réunion du 12 avril 2008 (MA) → **Christiane Delongueville & Roland Scaillet : Paysages de Bretagne** (photos de la faune marine et des mollusques).



La baie du Mont St Michel, Cancale, Erquy, la baie de St Brieuc, la baie de Douarnenez tant de nom qui font vibrer le cœur des amoureux de la Bretagne.

Et s'il existe deux amoureux de la Bretagne c'est bien Christiane et Roland, lorsqu'ils ont posé leurs pieds pour la première fois sur les plages Bretonnes, jamais ils n'auraient pensé que trente ans plus tard ils y retourneraient encore chaque année.

Ce fût un petit pas pour l'homme, mais un très grand pas pour la malacologie et la SBM.

Grâce à ce pas de géant, nous avons pu admirer ce samedi une rétrospective en image de ces trente années passées à chasser la *Mytilus edulis*, la *Chlamys varia* et bien d'autres mollusques encore.

Ce voyage nous a permis de visiter de magnifiques endroits tel que la pointe de l'Arcouest avec en face l'île de Bréhat, la plage de Goaz trez, l'île Callot située au Nord de la presqu'île de Carantec et son petit port de pêche. Photos et commentaires judicieux accompagnés de quelques astuces de terrain nous ont permis de comprendre comment réaliser une récolte presque parfaite en tout lieu.

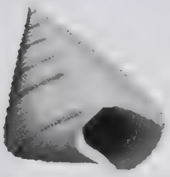
Nous avons ensuite continué notre périple, en descendant vers le Conquet avec face à lui ses îles célèbres, Ouessant, Molène etc… et ses phares, comme les pierres noires, les trois pierres et bien d'autres encore.

Notre tour de Bretagne se termina en passant par la baie de Douarnenez, la point du Raz et le Cap-Sizun où s'est installé un héliciculteur « Cap Hélix », nous nous sommes ensuite laissés porter par les courants pour arriver à la Pointe de Penmarch, le phare d'Eckmühl, le port de Kérity et terminer par la baie de Quiberon où non loin se dressent des pierres monumentales sur le site de Carnac.

Un grand merci à nos amis pour ce magnifique reportage et ces si belles photos.

Pour terminer tout cela en beauté nos amis Christiane et Roland avaient pensé à nous offrir une dégustation de cidre Breton et de biscuits purs beurre Breton bien évidemment.

Allez et comme on dit là-bas : Kénavo !!



Quoi de neuf ?

Claude VILVENS

Bourse de l' A.F.C. Section Nord

12 èmes Journées Internationales des Coquillages

Organisées par l' Association Conchyliologique du Nord

les 25 et 26 Octobre 2008
à FACHES-THUMESNIL (Sud de Lille)

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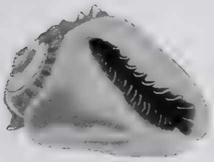

Nous avons reçu

Claude VILVENS

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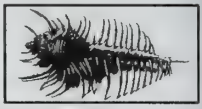

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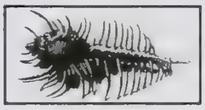

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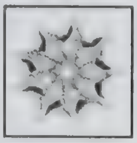

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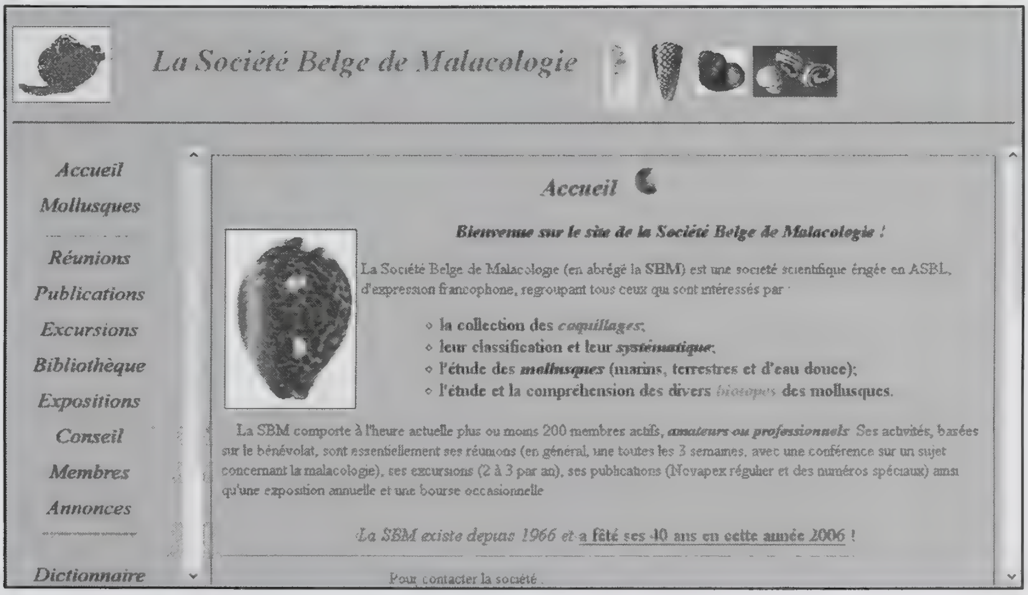

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La Société Belge de Malacologie (en abrégé la SBM) est une société scientifique érigée en ASBL, d'expression francophone, regroupant tous ceux qui sont intéressés par :

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THE KOREAN JOURNAL OF MALACOLOGY

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Vol 23, N° 2, décembre 2007

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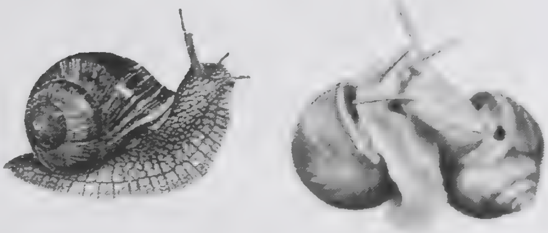

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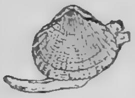
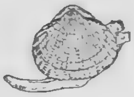


Grandes marées de l'année 2008



Christiane DELONGUEVILLE et Roland SCAILLET

L'année 2008 s'annonce assez médiocre avec un coefficient de 109 au maximum en avril. Le début de l'année (mars - avril - mai) et le mois d'octobre permettront néanmoins quelques rares observations. Ne ratez pas ces opportunités car il n'y en aura guère d'autres…

Coefficients (> 100) des pleines mers à Brest

(Les marées basses correspondantes sont donc particulièrement intéressantes à prospecter.)

Janvier	-	-
Février	-	-
Mars	Samedi 8	101 - 104
	Dimanche 9	106 - 107
	Lundi 10	106 - 104
	Mardi 11	101 - (96)
Avril	Dimanche 6	104 - 107
	Lundi 7	109 - 109
	Mardi 8	108 - 105
	Mercredi 9	101 - (95)
Mai	Lundi 5	100 - 103
	Mardi 6	104 - 104
	Mercredi 7	103 - 100
Juin	-	-
Juillet	-	-
Août	Dimanche 3	100 - 100
	Dimanche 31	(98) - 101
Septembre	Lundi 1	101 - 101
	Mardi 16	(98) - 100
	Mercredi 17	101 - 101
	Jeudi 18	100 - (97)
Octobre	Mercredi 15	100 - 102
	Jeudi 16	103 - 103
	Vendredi 17	101 - (98)
Novembre	Vendredi 14	100 - 100
Décembre	-	-

Voici nos recommandations habituelles :

1. Respectez la nature, c'est le moins qu'on lui doit.
2. Observez, photographiez et n'échantillonnez que le strict nécessaire.
3. Remettez toujours les pierres déplacées en place et obligatoirement dans le bon sens.
4. Renseignez-vous sur l'heure et la hauteur exacte de la marée basse à l'endroit où vous vous trouvez.
5. Surtout ne commettez pas d'imprudence, évitez les pièges et soyez vigilants.

Bonnes marées !

REFERENCE :

Annuaire des Marées pour l'année 2008 - Tome I - Ports de France - SHOM (Service Hydrographique et Océanographique de la Marine) - *Paris - 201 p.*

Pêche à pied à Kerhostin (presqu'île de Quiberon - Morbihan)

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SOCIETE BELGE DE MALACOLOGIE

Revision of the genus *Kanamarua* Kuroda, 1951 (Gastropoda: Colubrariidae) with the description of two new species

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KEYWORDS. Gastropoda, Colubrariidae, *Kanamarua*, Arafura Sea, Australia, China, Guadeloupe, Japan, Mozambique, Philippines, Somalia, South Africa, Vanuatu, new taxa.

ABSTRACT. The deep water genus *Kanamarua* Kuroda, 1951 is distinguished from the buccinid genus *Metula* H. Adams & A. Adams, 1853 on the basis of shell sculpture and protoconch morphology. The original description of the genus is translated from Japanese. We consider *Kanamarua* as belonging to Colubrariidae according to Okutani (2000: 500-501). Previously known only from the Indo-West Pacific, the range of the genus is extended into the West Atlantic.
Kanamarua adonis (Dall, 1919) is recorded from the Tanimbar Islands (Indonesia) and off Luzon and Mindoro Islands (Philippines), extending the range to the west and the south.
Kanamarua tazimai Kuroda, 1951 is reinstated as a distinct species and removed from synonymy with *K. adonis*, the original description is translated from Japanese.
Kanamarua rehderi Kilburn, 1977 and *Metula vicdani* Kosuge, 1989 are senior synonyms of *Kanamarua hyatinthus* Shikama, 1973, the taxon is briefly discussed with special attention to its wide geographic range. The species is recorded from Vanuatu Islands, extending the range in southwestern direction.
Metula boswellae Kilburn, 1975 is transferred to *Kanamarua*, based on conchological characteristics.
Kanamarua narcissisma sp. nov. (Indonesia and Australia) and *Kanamarua francroberti* sp. nov. (Guadeloupe) are here described.

INTRODUCTION

However described by Kuroda (1951: 69-70) as a distinct genus, *Kanamarua* became subsequently often regarded as a subgenus of *Metula* H. Adams & A. Adams, 1853. In the present paper we confirm *Kanamarua* Kuroda, 1951 as a distinct genus.
Kuroda (1951: 71) already mentioned some conchological characteristic with colubrariid affinities and also Okutani (2000: 501) placed the genus in Colubrariidae. We follow this opinion while waiting for anatomical evidence (pers. comm. Y. Kantor).
Indonesia harbours a rich biodiversity, which has attracted many naturalists and scientists, among them Georgius Everhardus Rumphius (17th century) and Alfred Russel Wallace (19th century). The deep sea fauna, however, has received much less attention. In this context, the Muséum national d'Histoire naturelle (Paris, France) and LIPI (Indonesia) cooperated in a survey of the eastern part of the archipelago in order study the deep water benthos. Important material reported on in the present study originates from the KARUBAR expedition to Indonesia conducted in 1991. The KARUBAR expedition is part of the still ongoing sampling programme to study the tropical deep-sea benthos in the Indo Pacific for a better knowledge of the biodiversity. We refer to Crosnier et al. (1997) for a narrative of this cruise and station lists.
The Philippines are the hotspot of marine biodiversity. The unique character of this fauna is shown by the impressive number of molluscan groups and species collected in the last decade. The *Kanamarua* species from the Philippines reported on in the present study originate from the MUSORSTOM expeditions conducted by the Muséum national d'Histoire naturelle (Paris, France) and the efforts of Conchology Inc. (Cebu, Philippines).
In April 2002 a remarkable shell was dredged off Guadeloupe by Francis Robert during his activities as a fisherman. It took until 2006 to find a second specimen and we may call it “a rare species”. A third specimen was collected more recently, in May 2007,

providing sufficient material for a comparative study and allowing us to describe the species. Morphology of the protoconch, sculpture and pattern of the teleoconch as well as apertural shape serve as criteria to assign this species to the genus *Kanamarua* Kuroda, 1951. The range of the genus is hereby extended from mainly Indo-West Pacific towards the Atlantic.

Metula boswellae Kilburn, 1975 is a well know species and became, due to the beautiful pattern and colour, one of the classic buccinids from southeastern Africa. In the present paper this species is transferred to the genus *Kanamarua* on the basis of its shell sculpture and protoconch morphology.

The material reported on in the present study originates from:

(a) CORINDON 2 expedition to Makassar Strait conducted in 1980.
(b) KARUBAR expedition to Indonesia conducted in 1991.
(c) MUSORSTOM 2 and MUSORSTOM 3 expeditions to the Philippines conducted in 1980 and 1985.
(d) MUSORSTOM 8 expedition to Vanuatu conducted in 1994.
(e) by-catch of commercial fishing vessels operating off South Africa, Mozambique, Somalia, Japan, China, Philippines and Australia.
(f) shells caught by local fishermen in Guadeloupe.

Material from the French expeditions is, unless otherwise stated, deposited in MNHN. The material is, unless being types (which are allocated to catalogue numbers), unambiguously designated and retrievable by the combination of expedition acronym and station number.

Abbreviations

ASAM: collection Dominique Lamy, AS Antilles Mollusques, Baie-Mahault, Guadeloupe.
IMT: Institute for Malacology Tokyo, Japan.
KF: collection Koen Fraussen, Belgium.
KPM: Kanagawa Prefecture Museum, Yokohama, Japan.
MC: collection Mitsuo Chino, Kawasaki, Japan.
MNHN: Muséum national d'Histoire naturelle, Paris, France.
MP: collection Manfred Parth, Germany.
MZB: Museum of Zoology, Bogor, *Museum Zoologicum Bogoriense*, Pusat Penelitian Biologi, LIPI, Indonesia.
NHM: Natural History Museum, London, England.
PPC: Philippe Poppe collection, Conchology Inc., Cebu, Philippines.
WAM: Western Australian Museum, Perth, Australia.
ZRC: Zoological Reference Collection, Raffles Museum of Biodiversity Research, Singapore.
CC: (chalut à panneaux, crevette) otter trawl, shrimps
CH: (chalut à panneaux, poisson) otter trawl, fish
CP: (chalut à perche) beam trawl
DC: (drague Calypso) Calypso dredge
DE: (drague épibenthique) epibenthic sledge
DW: (drague Warén) Warén dredge
ET: Engel trawl
alc: in alcohol collection (MNHN)
dd: empty shell, dead collected
juv: juvenile or subadult specimen/shell
lv: collected alive

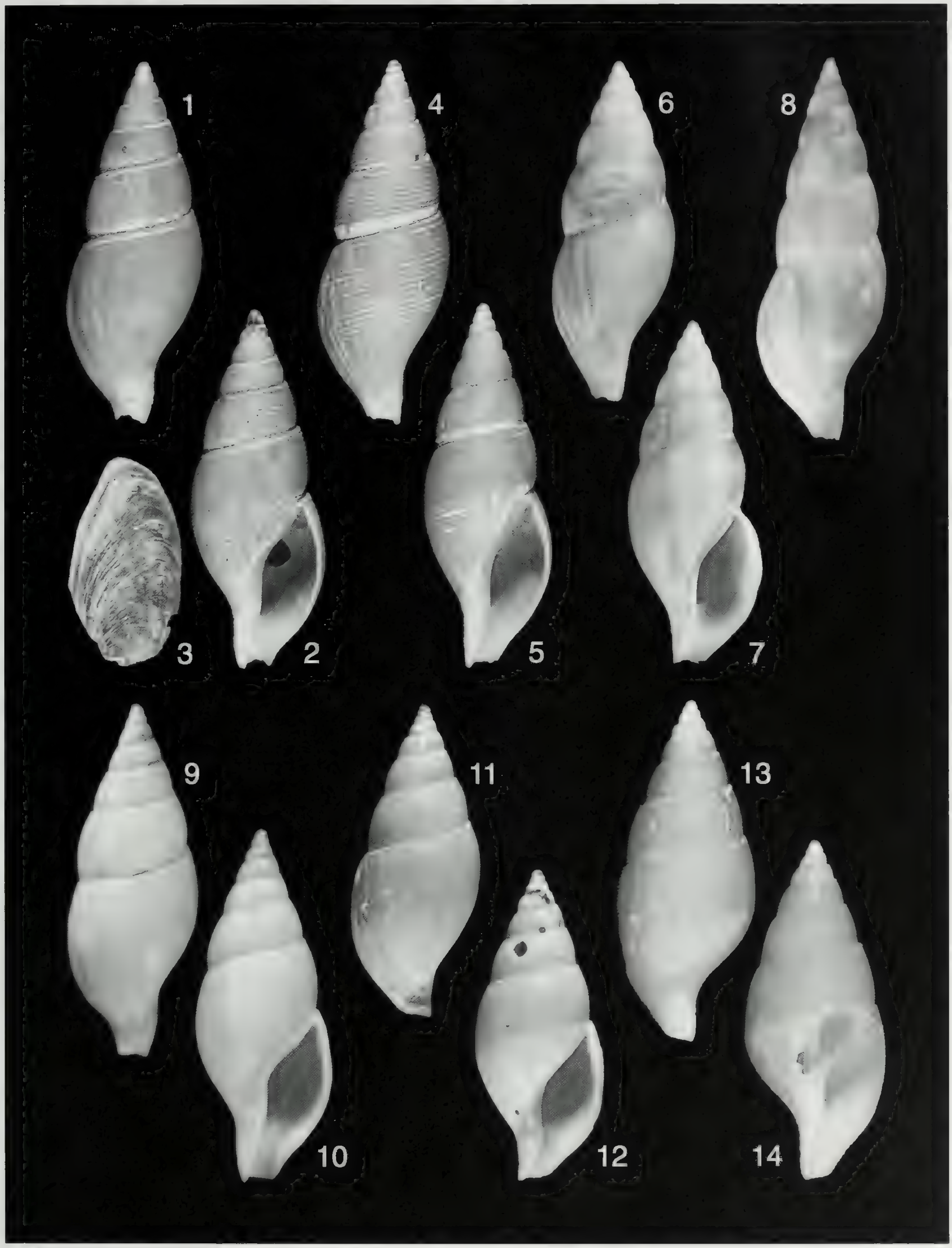
SYSTEMATICS

COLUBRARIIDAE Dall, 1904
Genus ***Kanamarua*** Kuroda, 1951: 69
Type species. *Colus* (*Aulacofusus*) *adonis* Dall, 1919, by original designation, Tropical West Pacific.

Original description. Kuroda (1951: 69-70), translated from Japanese by Mitsuo Chino. "*Dedicated to Mr. T. Tazima Kanamaru, to celebrate his 60th Birthday. Kanamaru greatly contributed in the administration of the society, with special attention for the accounting for more than 20 years, since the beginning of the foundation of Malacological Society of Japan.*
Kanamarua *nov., new genus, type species* Colus *(*Aulacofusus*)* adonis *Dall (1919, Proc. U. S. Nat. Mus. 56 (2295): 316. Suruga Gulf, 503 fms. Original author Dall, in 1912 in his second report, classified this species within subgenus* Anomalopsipho 2) *and extended the range to Alaskan waters. We cannot confirm his conclusion because we, unfortunately, cannot clarify the taxonomy of the specimen obtained from that extended part of the range. However, it would be impossible that species from Japan become included in this subgenus, moreover they do not belong to the genus* Colus *either*.".

Figures 1-14

1-5. *Kanamarua narcissisma* sp. nov.,
1-3. holotype, 31.8 mm, operculum 6.9 mm, Indonesia, Tanimbar Islands, KARUBAR, stn CP75, 451-452 m, MNHN-20892; **4-5.** paratype 1, 31.6 mm, Indonesia, Tanimbar Islands, KARUBAR, stn CP72, 676-699 m, MNHN-20893.
6-8. *Kanamarua tazimai* Kuroda, 1951, 6-7: 37.1 mm, 8: 47.0 mm, East China Sea, 150-400 m, KF-4917.
9-14. *Kanamarua adonis* (Dall, 1919)
9-10. 32.2 mm, Japan, Mie Prefecture, 200-300 m, KF-0109; **11-12.** 30.6 mm, Philippines, Luzon, MUSORSTOM 8, stn CP82, 550 m, MNHN; **13-14.** 35.5 mm, Indonesia, Arafura Sea, KARUBAR, stn CP91, 884-891 m, MNHN.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And:

Kuroda (1951: 71), translated from Japanese by Mitsuo Chino. “*These characteristics are sufficient to establish a new genus.*

Protoconch with one and a half whorl, the apex is dull, high, smooth, lustrous oval, carnicolor when fresh, gradually becoming darker and horn coloured become the same color as the body whorl

Columella very narrow, umbilicus transparent when seen from below, columellar margin with weak edge, columellar fold weak. Length 37.3 mm, width 13.6 mm, number of whorls 8 1/3. Another specimen: 33.7 mm x 12.4 mm and with 8 whorls.

This genus could be classified close to Metula, *the animal has no radula as is concluded by Dr. Tadashige Habe after anatomical examination of a specimen. The operculum is small, thin, oval, light yellow in colour, the nucleus in almost terminal position.*“

Remarks. The genus *Kanamarua* is characterized by a lens-shaped shell with lens-shaped aperture, a glossy surface with fine and sharp spiral incisions, and a narrow columellar lip. The protoconch is rather blunt, with 1 to 2 1/4 glossy, convex, always smooth whorls. The ground colour of the teleoconch is ranging from white, pale yellowish brown to flesh coloured, occasionally with a flamboyant pattern of dark brown spiral bands with alternating white and brown axial strikes.

No radula was found in *K. adonis* by T. Habe (Kuroda 1951: 71) but recent anatomial investigation on *K. narcissisma* sp. nov. has show traces of a minuscule radula (pers. comm. Y. Kantor) and some colubrariid features.

Metula H. Adams & A. Adams, 1853 is similar in shape but differs by having a granulated spiral sculpture, sharp axial ribs and strong spiral cords on the apical whorls and a multispiral, rather sharp protoconch. Protoconch morphology in *Metula* is quite variable in number of whorls and in shape, ranging from 2 up to 4 whorls and with or without a spiral fold.

Metula amosi Vanatta, 1913, which is the type species of the genus *Metula* H. Adams & A. Adams 1853 (Emerson, 1986: 27-30), has a granulated sculpture and a multispiral protoconch.

Iredalula Finlay, 1926 may be similar in sculpture but differs by having broad spiral interspaces, laterally slightly flattened whorls with a more angulate shoulder and a shorter base in combination with a broader siphonal canal.

Bouchet & Warén (1986: 482) suggested that *Kanamarua* might end up in the synonymy of *Anomalosipho* Dautzenberg & Fischer, 1912 (type species *Neptunea* (*Sipho*) *verkruzeni* Kobelt, 1876, by original designation). *Anomalosipho verkruzeni* (Kobelt, 1876) differs in having a rather thick and more porous shell, a broader aperture, an assymetric and slightly curved operculum with terminal nucleus (instead of oval), a thick greenish periostracum and a buccinid radula.

Kuroda (1951: footnotes, p. 69) translated from Japanese by Mitsuo Chino: "*2) 1912. '*Sipho *(*Anomalosipho*)* verkruzenii *Kobelt', Dautzenberg et Fischer, Res.Camp.Sci.Prince de Monaco, Fasc. 37: 99, pl. 4, fig. 8 [original spelling was* Anomalisipho, *however, index p. 607 misprinted* Anomalosipho.*]. 1876.* Sipho verkruzeni *Kobelt, Jahrb. Deutsch. Mal. Ges. 70 pl. 2, figs. 1, a-b. his type specimen has a high spire, the shell covered with a greenish periostracum, the spiral sculpture dense with minute cords, the outer margin recurved, the inner margin without denticles, without axial ribs, as a result it clearly indicates to be a member of the* Colus *Group.*"

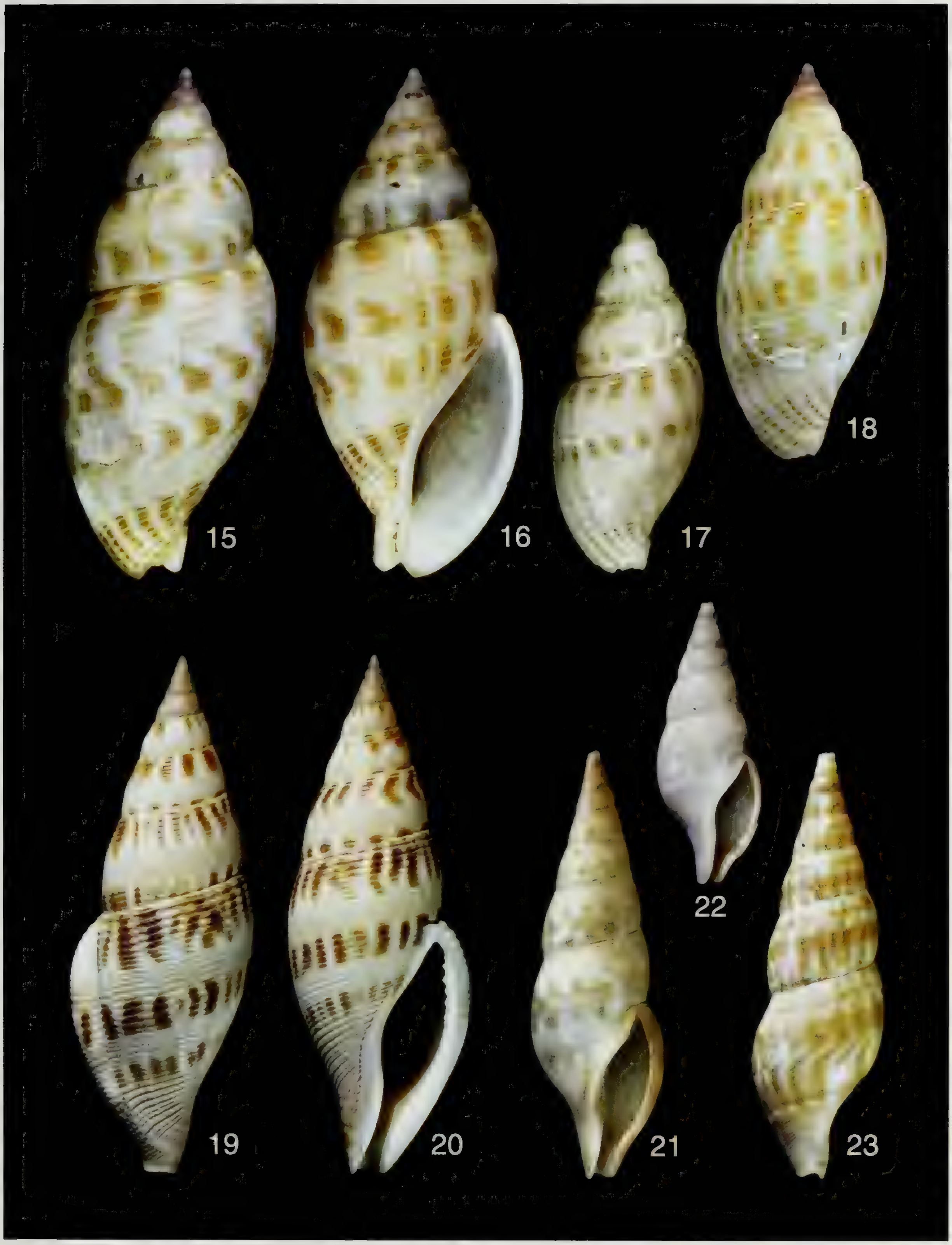
Included species

Kanamarua adonis (Dall, 1919)
Kanamarua boswellae (Kilburn, 1975) comb. nov.
Kanamarua francroberti sp. nov.
Kanamarua hyatinthus Shikama, 1973
Kanamarua narcissisma sp. nov.
Kanamarua tazimai Kuroda, 1951

Another species which eventually may become included in the genus *Kanamarua* is *Metula somalica* Bozzetti, 1993. We have no specimens for examination and do not formulate any opinion about its generic position.

Figures 15-23

15-18. *Kanamarua francroberti* sp. nov.,
15-16. holotype, 58.0 mm, Guadeloupe, off Phare de Vieux Fort, 300 m, MNHN-9968; **17.** paratype 1, 47.7 mm, Guadeloupe, north east off Marie Galante Island, 250 m, ASAM; **18.** paratype 2, 40.7 mm, same locality, KF-5190.
19-20. *Kanamarua boswellae* (Kilburn, 1975), 78.9 mm, South Africa, Natal, deep water, KF-2634.
21-23. *Kanamarua hyatinthus* Shikama, 1973,
21-22. 21: 57.9 mm, 22: 42.5 mm Somalia, Ras Hafun, deep water, KF-1224; **23.** 58.1 mm, Philippines, Balicasag Island, deep water, KF-2748.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Kanamarua adonis (Dall, 1919)

Figs 9-14, 31-32

Colus (Aulacofusus) adonis Dall, 1919: 316. Type locality: "U. S. Bureau of Fisheries station 5053, in Suruga Gulf, Japan, in 503 fathoms, mud; bottom temperature, 34.9° F.".

Tritonofusus adonis – Dall, 1918: 218, *nomen nudum*.
Anomalosipho adonis – Dall, 1921: 95.
Colus adonis – Dall 1925: 11, pl. 1, fig. 8.
Colus adonis – Oldroyd, 1927: 222-223, pl. 13, fig. 8.
Colus (*Anomalosipho*) *adonis* – Kuroda,1936: 181.
Kanamarua adonis – Kuroda, 1951: 70-71.
Colus (*Anomalosipho*) *adonis* – La Roque, 1953: 208.
Colus (*Anomalosipho*) *adonis* – Abbott, R. T., 1974: 210.
Kanamarua adonis – Kira, 1955: 52-53, pl. 26, fig. 6.
Kanamarua adonis – Habe & Ito, 1965: 48, pl. 13, fig. 27.
"Colus adonis" – Kosuge, 1975: pl. 12, fig. 3.
Kanamarua adonis – Habe & Okutani, 1975: 120, fig.
Kanamarua adonis – Bouchet & Warén, 1986: 482-483, figs. 100-101.
Kanamarua adonis – Okutani, 2000: 500-501, pl. 249, fig. 1.

Original description. Dall (1919: 316). Shell small, bulimiform, thin, whitish with a pale olive periostracum, with about six whorls exclusive of the (lost) nucleus, with a very narrowly channeled suture and moderately rounded whorls; spiral sculpture of narrow equal flat threads (about three to a millimeter) with very narrow interspaces over the whole shell, though the interspaces are a little wider on the apical whorls and the spirals under-run there by thread-like axial sculpture, giving a somewhat punctate appearance under magnification; aperture elongate, rather narrow, the outer lip thickened, not reflected, with traces of liration near the inside margin; the body and pillar with a continuous layer of enamel; canal short, wide, with no siphonal fasciole. Height of shell, 37; of last whorl, 25; diameter, 15 mm.

Material examined. Indonesia: Makassar, CORINDON stn CH214, 00°31N, 117°50'E, 595 m, 1 lv juv, MNHN. - Tanimbar Islands, KARUBAR stn CP91, 08°44'S, 131°05'E, 884-891 m, 1 dd, MNHN.
Japan: Honshu, Shikoku, Kiisuido, 180 m, 1 dd, MNHN. - Off Maisaka, Shigaoka Prefecture, 250 m, 1 lv MC, 2 dd KF-5438. - Off Cape Shiono, 200 m, 1 dd, KF-3464. - Mie Prefecture, trawled, 200-300 m, 2 lv, KF-0109.
Philippines: Luzon, east off Lubang Island, MUSORSTOM 2 stn CP82, 13°47'N, 120°29'E, 550 m, 2 dd, MNHN. - Mindoro, south off Templo Island, MUSORSTOM 3 stn CP118, 11°58'N, 121°06'E, 448-466 m, 3 dd, MNHN.

Range and habitat. Previously known from Japan and Taiwan, the range is here extended into Indonesia and the central Philippines.
The species is recorded from the American West Coast by Dall (1921: 95) and Oldroyd (1927: 222-223), but we agree with Bouchet and Warén (1986: 483) that this record is rather doubtful.

Remarks. Kuroda (1951: 70-71), translated from Japanese by Mitsuo Chino. "*The range of* C. adonis *is Suruga Bay and Tosa, Kii. The shell is shaped as a willow leave, fusiform, with minute sculpture, the upper whorls delicately reticulated. The last whorl is obviously similar to the description by Dall. The aperture is stretched ahead towards posterior canal, the outer lip is thin but with distinct varix. The inner lip has a thick columellar, the margin is rather distinct, recurved, inner side of callous having 4-5 denticles in upper (posterior) part, and slightly curved. Inner part callous in anterior denticle knobs gradually weakened counting 16 to18. Suture with strong edge, the outer margin somewhat reminds that of* Colubraria *species, but is weaker.*
The shells sculpture and the overall shell shape resembles the genus Metula, *the sculpture is weak, the spire short, the anterior canal rather long, the whole shell is very thin.*"
Kanamarua adonis is characterized by a broad, lens-shaped shell with numerous fine spiral grooves. The specimens from Indonesia are slightly different from Japanese specimens by having a coarser periostracum and a more accentuated suture.
Kanamarua tazimai differs by having slightly wider, more numerous spiral interspaces and by the presence of fine axial lines.

Kanamarua tazimai Kuroda, 1951

Figs 6-8, 29-30

Kanamarua tazimai Kuroda, 1951: 71.

Kanamarua tajimai – Habe & Okutani, 1975: 120, fig.
Kanamarua tajimai – Matsumoto, 1979: 52.
Kanamarua tazimai – Bouchet & Warén, 1986: 482 (with the original description translated from Japanese to English).
Kanamarua adonis tazimai – Okutani, 2000: 500-501, pl. 249, fig. 2.

Original description. Kuroda (1951: 71) translated from Japanese by Mitsuo Chino. "*As 2 very different types dwell sympatrically, therefore we have to give the new species a name.* Kanamarua tazimai, *if these variations are not caused by sexual nature. This type is very small and thin, rather slender, with a weak sculpture, counting only 6 1/2 whorls, the anterior canal seems slightly recurved, the outer apertural lip has no lirae inside (the canal is not fully matured),* *axial ribs are not significant. Height 21.0 mm, width 8.3 mm, another specimen is 21.5 mm x 8.0 mm. (* tazimai *). Collected by Mr. Akibumi Teramachi from off Muroto, Tosa, 120/150 fms deep."*

Material examined. Japan: Mie Prefecture, off Owase, 250 m, 5 lv, MC. - 450 m, 1 lv juv, KF-3305. - off; Owase, 250 m, 2 dd MC, 3 dd KF-5439. - Okinawa, Okima-Daito-Jima, 200 m, 1 lv MC, 3 dd KF-5437.

China: East China Sea, trawled by Chinese fishermen, 150-400 m, 3 lv, KF-4917.

Philippines: Balut Island, tangle nets, 150 m, 1 lv, PPC-333543.

Range and habitat. Previously known from Japan and East China Sea, the range is here extended into the central Philippines. In the northern part of the range (Japan) only known from deep water, the upper bathymetric limit in the East China Sea and Philippines is found in shallower waters.

Remarks. *Kanamarua tazimai* is characterized by having spiral interspaces on the upper spire whorls which are crossed by incremental lines, giving the sculpture a rather reticulate appearance. Occasionally with some axial pattern. The Japanese specimens (deep water) are small, when compared to the specimens from East China Sea and the Philippines, and their sculpture seems smoother. We regards these weak differences as included within the variability of the species.

K. adonis differs by having a smoother sculpture consisting of lesser and finer spiral lines and a broader shape.

Kanamarua narcissisma sp. nov.

Figs 1-5, 24-28

Type material. Holotype (31.8 mm) (KARUBAR stn CP75), MNHN-20892. Paratypes 1-3 (KARUBAR stn CP72), MNHN-20893, ZRC mol.101, KF-4959. Paratypes 4-5 (KARUBAR stn CP33), MNHN-20894, MZB.

Material examinated. Indonesia: Tanimbar Islands, KARUBAR stn CP59, 08°20'S, 132°11'E, 399-405m, 1 dd juv. - Stn CP69, 08°42'S, 131°53'E, 356-368 m, 4 dd (2 juv). - Stn CP70, 08°41'S, 131°47'E, 410-413 m, 3 dd (2 juv). - Stn CP72, 08°36'S, 131°33'E, 676-699 m, 4 dd (1 juv). - Stn CP75, 08°46'S, 131°36'E, 451-452 m, 1 lv. - Stn CP77, 08°57'S, 131°27'E, 346-352 m, 1 dd juv, MNHN.

Australia: NW off Port Hedland, 480 m, 2 dd, MNHN. - Queensland, Capricorn Channel, deep water, 1 lv juv, KF-3850.

Type locality. Indonesia, Tanimbar Islands, N/O " Baruna Jaya 1" KARUBAR stn CP75, 08°46'S, 131°36'E, 451-452 m.

Range and habitat. Known from Indonesia (off Tanimbar Islands) and western Australia (off Port Hedland). Bathymetric range 451-452 m for living specimens. Empty shells between 352 and 676 m.

Description. Shell up to 41 mm in length, thin, solid, semi transparant, white. Lens shaped, slender, with high spire and short siphonal canal. Teleoconch with 6 whorls. Suture deep.

Protoconch white, smooth, consisting of 1 1/2 whorls. Diameter 1.2 mm. Transition to teleoconch marked by minute axial thread.

Fifth teleoconch whorl with 8 flat, broad spiral cords and 1 fine subsutural cord. Interspaces fine. Second whorl with 9 spiral cords. Third whorl with 13 spiral cords, interspaces becoming deeper and slightly broader. Penultimate whorl with 17 spiral cords, subsutural one fine, interspace between subsutural and second cord deepest. Body whorl with 49 spiral cords, of which about 10 on siphonal canal.

Axial sculpture absent, occasionally consisting of fine axial lines on upper spire whorls, giving a reticulate appearance.

Aperture semi-oval, gently narrowing towards siphonal canal without any constriction. Outer lip thin, smooth, without lirae within. Columella smooth, without denticles. Aperture and siphonal canal together 1/2 of total shell length.

Periostracum thin, smooth, olive green, base and siphonal canal slightly paler, occasionally forming fine incremental lamellae in spiral interspaces.

Operculum thin, corneous, pale brown, nucleus terminal, pointed.

Remarks. *Kanamarua narcissisma* sp. nov. is characterized by a slender shell with numerous fine spiral cords and rather narrow but deep interspaces.

Kanamarua adonis and *K. tazimai* both differ by having a broader shape, a smoother shell and fine spiral interspaces.

Etymology. *Kanamarua narcissisma* sp. nov. is derived from the expresion "narcissism" ("Narzissismus" German) and named after another adonis: *Narkissos* (Greek, a beautiful youth in the mythologic "Metamorphosis" in ancient Greece).

Kanamarua hyatinthus Shikama, 1973

Text Fig. A, Figs 21-23, 34

Kanamarua hyatinthus Shikama, 1973: 7, pl. 2, fig. 15-16. Type locality: Taiwan.

Kanamarua rehderi Kilburn, 1977: 193-194, fig. 21. Type locality: southern Mozambique, between Inhaca Island and Ponto Zavora, ex pisce, 160 m deep.

Metula vicdani Kosuge, 1989: 130-131, pl. 50, fig. 1-4. Type locality: Philippines, Bohol, Panglao, 230-240 m deep. Holotype in IMT-88-176.

Kanamarua hyatinthus – Bouchet & Warén, 1986: 482.
Metula vicdani – Angioy, 1994: 4, fig.
Kanamarua rehderi – Bozzetti, 1994: 37-38, fig.
Kanamarua rehderi – Bozzetti, 1995: 76, fig.
Acamptochetus hyatinthus – Okutani, 2000: 500-501, pl. 249, fig. 3.

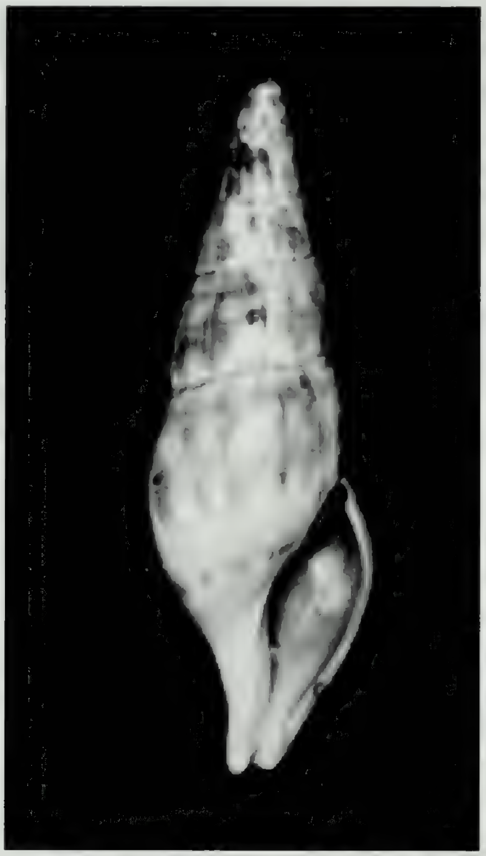


Fig. A. *Kanamarua hyatinthus* Shikama, 1973, holotype, 49mm, KPM-3818.

Material examined. Somalia: off Ras Hafun, trawled by fishermen, 150 m, 2dd, KF-1224. - Somalia, trawled by fisherman, 1 dd, MP. **Philippines**: MUSORSTOM 2 stn 19, 14°00'5N, 120°16'5'E, 189-192 m, 1 lv dd, MNHN. - Balut Island, by local fishermen, 1 dd, KF-4373. - Balicasag Island, tangle nets in deep water by local fishermen, 1 dd, KF-2748. - Aliguay Island, trawled, 60-120 m, 1 dd, PPC-000626. - Aliguay Island, trawled, 50-150 m, 1 lv juv, KF-5304. **Vanuatu**: MUSORSTOM 8 stn DW1141, 15°48'S, 167°08'E, 254-255 m, 1 dd juv, MNHN.

Range and habitat. Indo-West Pacific. Known from Mozambique and Somalia in the east, along Taiwan and Philippines, to Vanuatu in the west.

Remarks. *Kanamarua hyatinthus* is characterized by a slender shell with a high, sharp spire, a glossy surface with fine spiral incisions and usually a dark spiral band in between the centraly situated blotches. Empty collected shells usually have the pattern faded and may have a quite different appearance when compared with alive or fresh collected specimens. All specimens studied by us have a pattern based on the same, for the species characteristic, spiral bands in combination with short, curved, white axial flammulation.
All specimens known to us from the western Indian Ocean (often recorded as the distinct species *K. rehderi*) have a broken protoconch, but the teleoconch is identical in sculpture and pattern with the eastern specimens. Consequently we regard *K. rehderi* a junior synonym of *K. hyatinthus*.

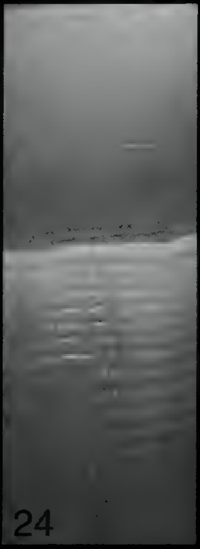
Kanamarua boswellae (Kilburn, 1975)
comb. nov.
Figs 19-20

Metula boswellae Kilburn, 1975: 594-595, fig. 10 b-c. Type locality: Mozambique.

Metula boswellae – Emerson 1986: 28.
Metula boswellae – Parth, 1992: 51, fig. 6.
Metula boswellae – Bozzetti, 1993: 111.
Metula boswellae – anonymous, La Conchiglia, 1994: 40, fig.
Metula boswellae – Bozzetti, 1995: 73, text fig.

Figures 24-34

24-28. *Kanamarua narcissisma* sp. nov.,
24. Australia: NW off Port Hedland, 480 m, MNHN; **25.** sculpture of holotype, MNHN-20893; **26.** Queensland, Capricorn Channel, deep water, KF-3850; **27-28.** scalebar 5 mm, protoconch of holotype, MNHN-20892.
29-30. *Kanamarua tazimai* Kuroda, 1951, East China Sea, KF-4917.
31-32. *Kanamarua adonis* (Dall, 1919),
31. Japan, off Cape Shiono, 200 m, KF-3464; **32.** Japan, Mie Prefecture, 200-300 m, KF-0109.
33. *Kanamarua francroberti* sp. nov., sculpture of paratype 1, ASAM.
34. *Kanamarua hyatinthus* Shikama, 1973, scalebar 5 mm, apex of juvenile with chipped protoconch, Vanuatu, MUSORSTOM 8, stn DW1141, 254-255 m, MNHN.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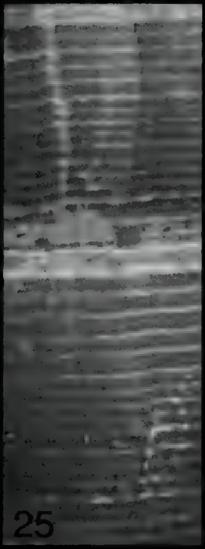
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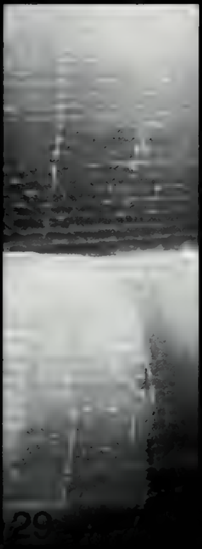
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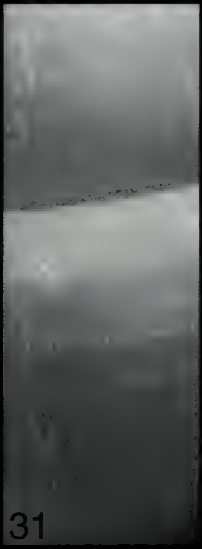
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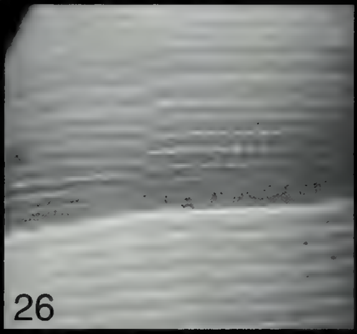
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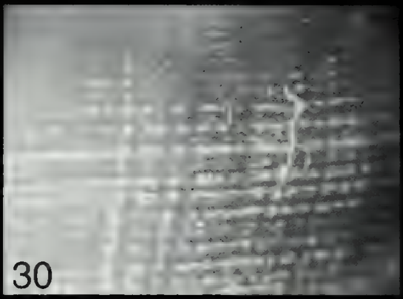
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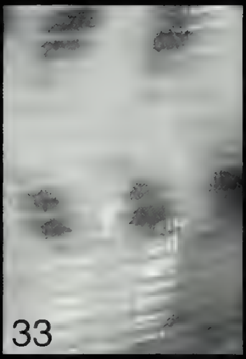
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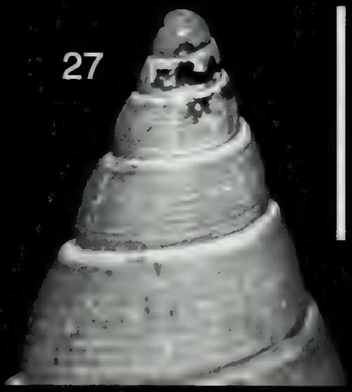
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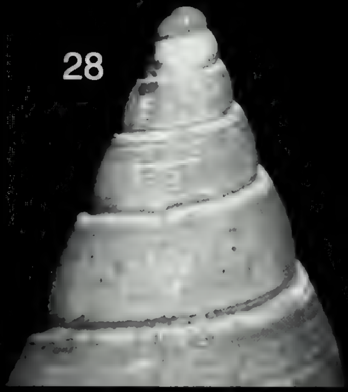
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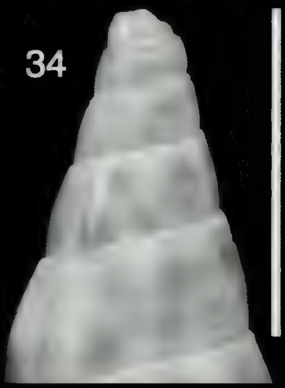
34

Material examined. Gulf of Aden: south off Yemen, trawled by fishermen, 100 m, 1dd, KF-1461.
Mozambique: trawled by fishermen, deep water, 3 dd, KF-0729.
South Africa: Natal: off Durban, trawled by fishermen, deep water, 1 lv, KF-2634. - off Zululand, trawled by fishermen, deep water, 4dd, KF-4247.

Range and habitat. Eastern Africa. Known from the Gulf of Aden in the north, along Mozambique, to South Africa in the south.

Remarks. *Kanamarua boswellae* comb. nov. is characterized by a thick, heavy shell sculptured with fine spiral grooves which are characteristic for *Kanamarua*, glossy and smooth protoconch whorls and a thick outer lip with apertural denticles inside. The peculiar pattern consists of 3 broad bands of rather rectangular reddish brown blotches on a flesh coloured background., giving the shell the appearance of *Metula*.

Kanamarua francroberti sp. nov.

Figs 15-18, 33

Type material. Holotype, 58.0 x 25.4 mm, Guadeloupe, off Phare de Vieux Fort, 300 m, 4/2002, in MNHN-9968. Paratype 1, 47.7 x 20.9 mm; Guadeloupe, north east off Marie Galante Island, 250 m, coll. ASAM. Paratype 2, 40.7 x 18.2 mm, same locality, KF-5190.

Type locality. Guadeloupe, off Phare de Vieux Fort, 300 m.

Range. Only known from the type material from Guadeloupe.
Description. Shell thin, rather fragile, large, up to 58.3 mm in length. Shape broad, rather ovoid, spire short for genus. Aperture slightly longer than 1/2 of total shell length. Whorls weakly convex, glossy, suture deep. Colour pinkish brown, pattern consisting of 4 brown, interrupted bands forming irregular blotches (on body whorl, 2 visible on spire whorl). Subsutural band consisting of rather rectangular blotches, peripheral bands consisting of curved axial streaks, band on siphonal canal consisting of narrow axial streaks.
Protoconch consiting of 2 1/4 smooth, rather convex whorls with slightly angular shoulder, tip flattened, suture deep. Diameter 1.6 mm. Transition to teleoconch distinct, marked by a fine, slightly flared larval lip.
Teleoconch consisting of 6 1/4 weakly convex whorls. Upper spire whorls with 7 fine, equally spaced spiral grooves, subsutural one slightly broader separating a fine, convex subsutural spiral cord. Penultimate whorl with 10 fine spiral grooves, occasionally an additional finer, almost invisible, secondary spiral groove in between. Body whorl with numerous fine spiral grooves of different strength, often alternating well visible (fine) and obscure (even finer). About 8 slightly broader spiral grooves on siphonal canal. Axial pattern on siphonal canal accentuated on top of spirals, paler in interspaces.
Aperture narrow, lens-shaped. Outer lip white, rather thick, simple, edge rather smooth with some weak, irregular nodulation. Columella white, smooth, callus adapically thin, abapically forming a thin lip. Siphonal notch simple, broad, open.
Animal, operculum and radula unknown.

Comparison. *Kanamarua francroberti* sp. nov. is characterized by having a broad shape, a rather smooth surface and four spiral bands with brownish dots.
The generic placement of *Kanamarua francroberti* sp. nov. is based on the spiral sculpture consisting of fine grooves, the smooth and glossy protoconch whorls, the narrow, lens-shaped aperture with some fine nodulations inside the outer lip and the thin and narrow columellar lip.
Kanamarua boswellae (Kilburn, 1975) comb. nov. is similar in pattern and sculpture but differs by having a slender shape with less convex whorls, stronger spiral grooves with broader interspaces and a thick outer lip.
Species belonging to the genera *Casmaria* H. Adams & A. Adams, 1873 (type species *Buccinum vibex* Linnaeus, 1758, subsequent designation by Harris, 1897, = *C. erinacea* (Linnaeus, 1758), Indo-Pacific) and *Semicassis* Mörch, 1852 (type species *Cassis japonica* Reeve, 1848, subsequent designation by Harris, 1897, = *S. bisulcata* (Schubert & Wagner, 1829), Indo-Pacific), which both belong to Cassidae Swainson, 1832, may look similar in shape and pattern but differ by having a broader and twisted columellar fold, a curled and slightly longer siphonal canal and a deeper siphonal notch.
Species belonging to the genus *Lyria* Gray, 1847 (type species *Lyria pattersonia* Perry, 1811, West Pacific), belonging to Volutidae Rafinesque, 1815, may look similar in shape and pattern but differ by the presence of columellar folds and by the outer lip that curls outwards with a smooth inner side.

Etymology. This species is named to honour Francis Robert (Guadeloupe), who collected the type material during his work as a fisherman, for his contributions to the knowledge of the local malacofauna.

ACKNOWLEDGMENTS

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Four new buccinid species (Gastropoda: Buccinidae) from the western Atlantic

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KEYWORDS. Buccinidae, western Atlantic, *Anna, Bartschia, Manaria, Retimohnia*,hydrocarbon vents, new taxa.

ABSTRACT. Four new buccinid species from the western Atlantic are described: *Anna florida* n. sp., the first western Atlantic species to be assigned to that genus; *Bartschia frumari* n. sp., and *Manaria burkeae* n. sp., two deep- water species from southern Florida; and *Retimohnia acadiana* n. sp., a presumed inhabitant of hydrocarbon cold vents in the Gulf of Mexico. All species are compared with their most similar congeners.

INTRODUCTION

During a 2004 dredging expedition in the Gulf of Mexico on board the R/ V Pelican I obtained two specimens of a buccinid species that defied generic placement. Upon inspecting my collection, I discovered two other lots of the same species collected more than 30 years earlier and identified as "*Pisania* sp.". Not being able to resolve the generic or specific problems of the species I contacted Dr. Harry G. Lee, of Jacksonville, Florida, who supplied me with 5 more lots. It is described here as *Anna florida* n. sp., the first species from the western Atlantic to be assigned to the genus *Anna* Risso, 1826.

Private deep- water dredging operations off the southwestern coast of Key West, Florida, have brought to light many interesting new species (García, 2007). Among them is a new species of *Bartschia*, described herein as *Bartschia frumari* n. sp., dredged in relative abundance by Frank Frumar, of Kirkwood, Missouri and his dredging partner Steve Kern, of Key West, Florida using the latter's lobster boat. The same two collectors also obtained at this same location several specimens of an undescribed *Manaria* species. This species had appeared in literature as *Mohnia carolinensis* (A. E. Verrill, 1884) (Sunderland, 1992:14) and had been identified as such in several private collections. However, Verrill's taxon is very different from the new *Manaria*, which seems to be confined to the deep waters off the southern tip of Florida. It is described in this paper as *Manaria burkeae* n. sp.

In 2002 Dr. Darryl Felder, chair of the Biology Department at the University of Louisiana,Lafayette, brought to me a series of interesting mollusks that he had collected at "Bush Hill", a name given to one of a series of deep- water hydrocarbon cold vents that occur off the Louisiana coast. Among this material, which has been reported elsewhere (García, 2002), there was a buccinid species that was first reported as a *Mohnia* species. Described here as *Retimohnia acadiana* n. sp., it is the first species of *Retimohnia* McLean, 1995 to be reported from the Gulf of Mexico.

After this paper was sent for review, I visited the collection of Kevan and Linda Sunderland, of Sunrise, Florida. In their collection, more specimens of *Anna florida* n. sp., *Bartschia frumari* n. sp., and *Manaria burkeae* n. sp. were discovered. The Sunderlands had obtained most of these specimens as a by-catch of Royal Red shrimp boats working in 200 to 400 m between Key West and Dry Tortugas, southern Florida.

Moreover, a mixed lot of four shells collected off Texas and recently sent to me by Dr. Fabio Moretzsohn contained three specimens of *Anna florida* n.sp.

All specimens in this study have been collected as empty shells unless otherwise stated.

Abbreviations

ANSP: Academy of Natural Sciences, Philadelphia, Pennsylvania, USA.
BMSM: Bailey-Matthews Shell Museum, Sanibel, Florida, USA.
EFG: author's collection
FF: Frank Frumar collection,Kirkwood, Missouri, USA.
HGL: Harry G. Lee collection, Jacksonville, Florida, USA.
KLS: Kevan and Linda Sunderland collection, Sunrise, Florida.
TAMUCC: Center for Coastal Studies, Texas A & M University, Corpus Christi, Texas, USA.
UF: University of Florida, Florida Museum of Natural History, Gainsville, Florida, USA.
USNM: National Museum of Natural History, Smithsonian Institution, Washington, DC, USA.

SYSTEMATICS

Family **BUCCINIDAE** Rafinesque, 1815
Genus ***Anna*** Risso, 1826

Type species: *Anna massena* Risso, 1826 (by monotypy).

Anna florida n. sp.

Figs 1-8

Type material. U. S. A.: Holotype ANSP 418032 length14.2 mm, width 6mm, 73 mi. WSW of Anna Maria Key, W. Florida, Gulf of Mexico, in 50 m (Figs 1-5). Paratypes: 1 ANSP 418033, 27°42.71'n, 84°13.09'W, in 68- 68.5 m (Figs 6-8); 1 EFG 25352, 24°44.77'N, 83°43.71'W, in 70.6- 72.9 m; 1 EFG13089, 1 UF 419133, 1 HGL, off Sugarloaf Key bridge, southern Florida, in 2 m (live); 1 HGL, off west Florida, in 59- 117 m (*ex pisce*); 2 HGL, 40-50 mi off Ponte Vedra, St. John's Co., NW Florida, in 44- 50 m; 4 KLS, off Peanut Island, Palm Beach, east Florida, 1.5 m; 5 KLS, off Big Pine Key, southern Florida, in 27 m. **BERMUDA**: 1 USNM 1111876, 1 HGL, Turtle Beach, south coast of Bermuda, 0 m.

Type locality. WSW of Anna Maria Key, W. Florida, Gulf of Mexico, in 50 m.

Other material examined. 4 juveniles, off Peanut Island, Palm Beach, east Florida, 1.5 m (KLS); 3 specimens, TAMUCC, Stetson Bank, Texas, L. Hyde 2000 (#51).

Distribution. East and west Florida, Texas and Bermuda, live specimens in 2- 73 m. Beach and *ex pisce* specimens have not been taken into consideration for depth.

Description. Holotype 14.2 mm in length, strong, fusiform (width/ length ratio 0.42) (Figs 1-2). Protoconch somewhat eroded, of approximately 1.5 whorls, white with dark dash by suture, brownish maculation near end of protoconch (Fig 3). Transition to teleoconch defined by growth scar and change in ornamentation. Teleoconch of 5.75 whorls; whorls slightly concave. Suture incised, emphasized by slight anterior constriction of whorls. Axial sculpture of strong, rounded costae; costae as wide as interspaces; approximately 10 costae on early whorls, increasing to 13 on last whorl; microscopic corrugated axial threads covering surface of shell. Spiral sculpture of strong, narrow cords; cords developing spirally elongated nodes when crossing axial elements; 5 such cords on early whorls, increasing to 6 on penultimate whorl; three peripheral cords strongest; presutural cord weakest; 13 cords on last whorl; weak spiral threads of uneven strength showing between and on spiral cords. Aperture elongate- ovate; outer lip thin at edge, downwardly convex,crenulated; a weak, varix-like thickening of shell showing behind; inner side with 8 elongated denticles (Fig 5); posterior canal delimited by two tooth- like projections at outer lip and on parietal wall (Fig 5); parietal wall slightly calloused, weakly erect except at posterior end, showing a strong tooth at anterior end, near basal constriction; tiny, sharp, unequal denticles appearing between anterior and posterior parietal teeth (Fig 4); anterior canal relatively long, almost straight, narrow, slightly wider anteriorly. Shell white, with irregular orange- brown maculations, mostly on top of nodes, at times creating axially oriented bands on shoulder of whorls.

Discussion. The paratypes have all of the main conchological characters of the holotype. The well-preserved protoconch of several paratypes and some juvenile specimens show a smooth surface with one or two irregular brownish spots, as well as a dash of the same color by suture on last whorl (Fig 7). Moreover, the ANSP paratype, a juvenile, and one of the paraypes collected off Ponte Vedra are covered with a yellowish, axially wrinkled periostracum (Fig 8). The largest adult specimen measures 15. 3 mm (HGL, *ex pisce*); the smallest measures 10.5mm (Sugarloaf Key). Interestingly, the larger specimens were collected in deep water and have a larger protoconch than the three shallow- water Sugarloaf Key specimens.

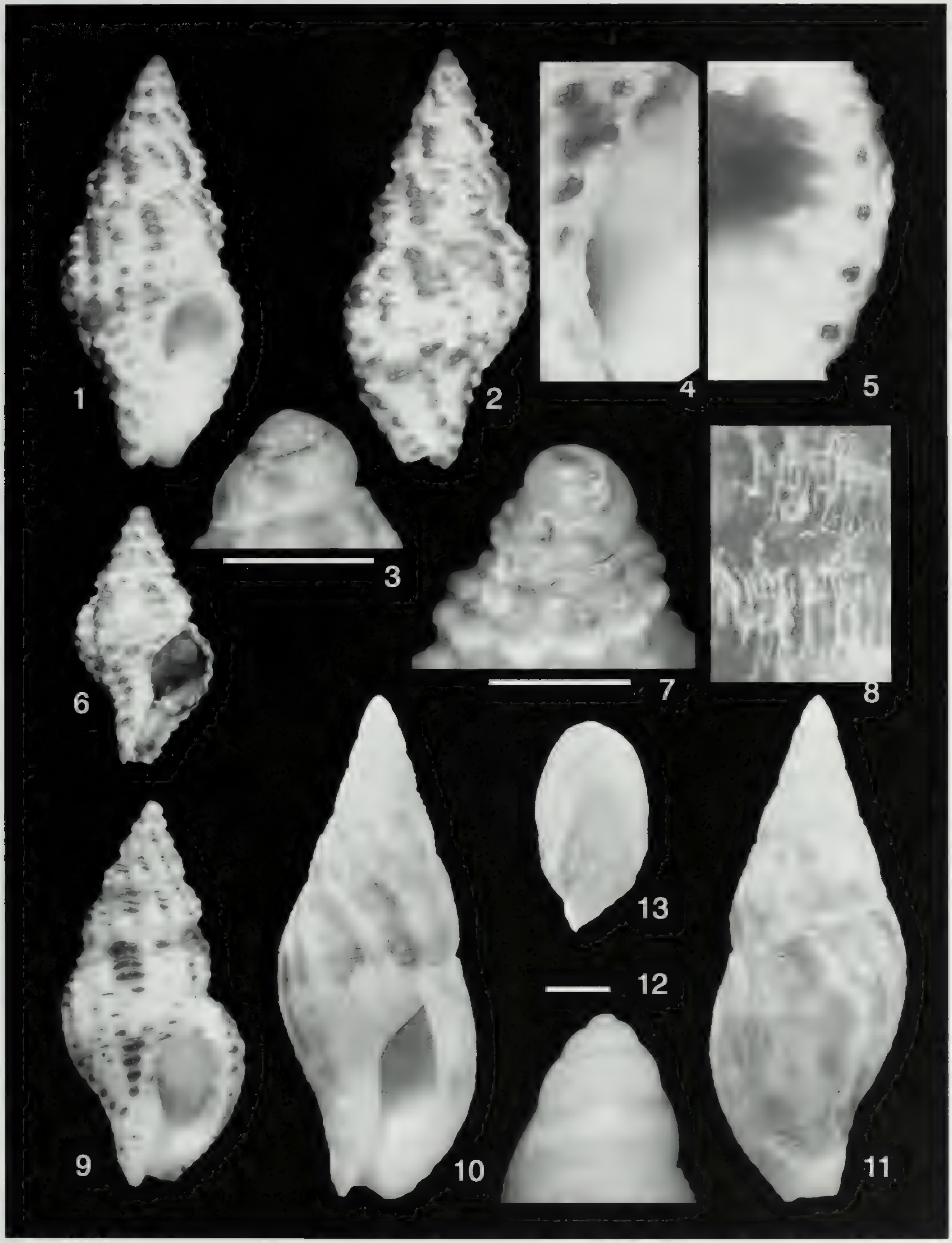
Most Recent species currently assigned to *Anna*, have been in the past variously assigned to *Cantharus* Röding, 1798, or *Pollia* Gray in Sowerby, 1834. However, Vermeij (2006) has shown the distinctive characters that separate *Anna* from other pisanine buccinids.

Vermeij (2006:72) has assigned 4 Recent species to the genus *Anna*: *A. assimilis* (Reeve, 1846), *A dorbignyi.* (Payraudeau, 1846), *A. massena* Risso, 1826 (= *Buccinum scacchianus* Philippi, 1844), and *A. scabra* (Locard, 1886). These species inhabit the eastern Atlantic, from western Europe and the Mediterranean to western Africa. Although Dall & Bartsch (1911: 287), and later Abbott (1974: 219), reported *Cantharus massena* from Bermuda, they were presumably referring to the new *Anna* species described herein, as specimens from that area have been studied and form part of the type material. *Anna florida* is the first species from the western Atlantic to be assigned to the genus *Anna.*

Figures 1- 13

1- 8. *Anna florida* n. sp. **1-5.** Holotype ANSP 418032 length14.2 mm, width 6mm, 73 mi. WSW of Anna Maria Key, W. Florida, Gulf of Mexico, in 50 m; **6-8.** Paratype, ANSP 418033, 27°42.71'n, 84°13.09'W, in 68- 68.5 m, 7.5 mm.

9. *Anna massena* Risso, 1826, Karaburun, Izmir, Turkey, Aegean Sea, 2 m (HGL); **10- 13.** *Bartschia frumari* n. sp. Holotype ANSP 418030 length 29.8 mm, width 12.2 mm, 24°14'N, 82°09'W; approximately 37 kms southwest of KeyWest, Florida, in 200 m.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Anna florida can be separated from all other congeners by the tiny sharp denticles present in the parietal wall between the anterior and posterior parietal teeth (Fig 4). On other shell characters it can only be confused with *Anna massena* (Fig 9), the type species of *Anna*. Both species have similar fusiform shells and superficially similar axial and spiral ornamentation, and the maculations of *Anna massena* also show mainly on top of the nodes and tend to form axially oriented bands on top of the whorls. However, *Anna massena* has finer, more irregular spiral cords and more elongated nodes, some showing only as spiral dashes of color; its nodes are a rich dark brown, rather than orange- brown; the axial costae on the body whorl are more numerous, weaker; the anterior canal is somewhat shorter, and the shell does not seem to attain the larger size of *Anna florida*.

Etymology. From the Latin *floridus* (adjective, meaning full of flowers), in reference to the profusion of bright nodes that cover the surface of the shell. The epithet is also meant to evoke both the state of Florida, whose name has the same provenance and where the new species seems to be most common, and Anna Maria Key, its type locality in that state.

Genus ***Bartschia*** Rehder, 1943
Type species: *Bartschia significans* Rehder, 1943, by original designation.

Bartschia frumari n. sp.
Figs 10-13

Type material. Holotype ANSP 418030 length 29.8 mm, width 12.2 mm (Figs 10-11). Paratypes: 1 ANSP 418031, 1 USNM 1111875, 1 UF 419134, 1 BMSM 15028, 2 EFG 28093, 29 FF, 24°14'N, 82°09'W; approximately 37 kms southwest of KeyWest, Florida, in 200 m; 6 KLS, between Key West and Dry Tortugas, in 200 to 400 m

Type locality. 24°14'N, 82°09'W; approximately 37 kms southwest of KeyWest, Florida, in 200 m (live).

Other material examined. 10 juveniles, between Key West and Dry Tortugas, in 200 to 400 m (KLS).

Distribution. Between Key West and Dry Tortugas, in 200 to 400 m.

Description. Holotype 29.8 mm in length, solid, elongate- ovate (width/ length ratio 0.41) (Figs 10-11). Protoconch conical, of approximately 3.5 whorls; first whorl conspicuously small, less than half the size of subsequent whorl; second whorl strongly convex, shouldered; following whorls rapidly decreasing in convexity; whorls smooth, polished (Fig 12); termination of last protoconch whorl creating weak, inconspicuous axial threads; transition to teleoconch whorls signaled by appearance of spiral elements and strengthening of axial threads, creating a nodulose surface. Teleoconch of 4.25 whorls; whorls slightly convex. Suture appressed, subsuturally delineated with strong, rounded beads; termination of suture slightly raising where labral thickness begins. Axial sculpture of numerous, narrow, sinuous, beaded riblets; riblets as wide as interspaces, becoming more irregularly spaced on last whorl; microscopic axial threads covering surface of shell. Spiral sculpture of 8 beaded cords of almost even strength on early whorls, increasing to 10 on penultimate whorl; beads well-defined, rounded on early whorls and subsutural cord, more spirally elongated on later whorls; cords as wide as interspaces. Aperture narrowly ovate, pointed posteriorly; outer lip strengthened behind by low, broad, varix- like thickening of shell; inner labrum beveled, thicker portion showing numerous elongated denticles; posterior denticles stronger; parietal wall and columella covered with smooth callus; callus widening, thickening posteriorly; anterior canal broad, relatively short, only slightly recurved. Shell light cream, with irregular yellowish- brown maculations of different intensity; some darker maculations tending to form axial flammules; aperture and parietal wall milky-white, polished.

Discussion. The genus *Bartschia* has been synonymized with *Metula* H & A Adams, 1853 (Rosenberg, 2005); however, although the synonymy may prove to be true when radular and other anatomical studies are conducted, I have chosen to place the new species in *Bartschia* because of the large protoconch shared by *Bartschia frumari* and *B. significans*, unlike the small protoconch of species assigned to *Metula*. Moreover, in typical *Metula* the cancellate sculpture is more defined because of pitting where axial and spiral elements cross, the labral thickening is narrower, more varix- like, and the sub-sutural cord stands out more, either because of size or spacing.

The paratypes of *Bartschia frumari* conform in all major characters with those of the holotype. Of the 28 adult specimens studied, the largest measures 34.4 mm (FF). Some specimens as small as 21.6 mm (FF) have already developed the labral thickening. Although the shell coloring of the paratypes is similar to that of the holotype, a few specimens tend to form 1 to 3 irregular bands: sub- suturally, peripherally, and/ or anteriorly. The coloring of these bands intensifies at the labrum, where they may show as yellowish- brown rectangular maculations. The inner labrum denticles in adults vary from strong to absent (EFG 228093).

Bartschia frumari can only be confused with its congener, *B. significans* (Fig 14), from which it differs by having a conical protoconch (Fig 12) instead of dome- shaped (Fig 15; see also Olsson & Bayer, 1972, p. 924, fig. 14), less numerous axial and spiral elements, 4.25 teleoconch whorls instead of 5.5, and by growing to a smaller size. Although the maximum reported size for *B. significans* is 54.5 mm

(Rosenberg, 2007), this species grows to at least 56.5 mm (EFG 15060a), nearly twice as large as the largest *B. frumari*. The two species live sympatrically; the large specimen of *B. significans* and several other slightly smaller specimens I have inspected were collected from Dry Tortugas to Key West, southern Florida, in 200 to 400 m.

Etymology. Named for Mr. Frank Frumar, of Kirkwood, Missouri who, together with Steve Kern, of Key West, Florida collected the shells and donated most of the type material.

Genus ***Manaria*** Smith, 1906
Type species: *Manaria thurstoni* Smith, 1906 by original designation.

Manaria burkeae n. sp.
Figs 16-22

Type material. Holotype ANSP 418034 length 33.5 mm, width 13.2 mm. 24°14’N, 82°09’W; approximately 37 kms southwest of KeyWest, Florida, in 200 m (Figs 16-17). Paratypes: 4 FF, 24°14’N, 82°09’W; approximately 37 kms southwest of KeyWest, Florida, in 200 m; 1FF, 16 miles SW of Key West, Florida, 170 m (live); 1 HGL, SE of Alligator Reef Lighthouse, approximately 24°51'N 80°37'W, in135- 150 m, 1 EFG 11554, ESE of Key West Florida, in 300 m; 2 KLS, 1 EFG 28329, between Key West and Dry Tortugas, in 200- 400m.

Type locality. 24°14’N, 82°09’W; approximately 37 kms southwest of KeyWest, Florida, in 200 m.

Distribution. From Islamorada Key to Dry Tortugas, lower Florida Keys, offshore in 135 to 400 m. Collected alive at type locality.

Description. Holotype 33.5 mm in length, light in weight but strong, fusiform (width/ length ratio 0.39) (Figs 16-17). Protoconch slightly eroded, translucent white, bulbous, paucispiral, of approximately 1.75 whorls, smooth, showing one narrow axial fold behind termination of last whorl, Transition between protoconch and teleoconch conspicuous, signaled by appearance of strong axial and spiral elements. Teleoconch of 6 whorls; early whorls almost straight-sided; last whorl convex, inflated, occupying nearly 60% of shell length. Suture deep, channeled. Axial sculpture on first three whorls of 12 or 13 strong, angular ribs; ribs as wide as interspaces, quickly weakening in strength on later whorls, almost completely evanescing on last two whorl; numerous axial threads covering surface of shell. Spiral sculpture of 5 sharp, nodulose cords; sutural cord weakest; cords slightly narrower than interspaces, creating an undulating pattern when crossing over axial elements; intercalating secondary cords appearing on antepenult whorl; cords gaining strength on later whorl, becoming almost as strong as primary cords on last whorl, becoming imbricated as they cross over axial threads; approximately 30 primary and secondary cords on last whorl. Aperture elongate-ovate, lirate within; labrum thin; parietal wall strongly arched, showing a spiral sculpture of shell surface at either end of wall, smoother at middle, developing a somewhat bidentate callus at basal constriction; anterior canal long, rather narrow, twisted to the left. Shell ivory- white; spiral cords pale yellow.

Discussion. The somewhat eroded protoconch of the holotype shows one axial fold behind the termination of the last whorl; however, fresher, younger specimens in the type series show as many as four such folds (Fig 22). Moreover, the axial sculpture of the teleoconch may evanesce at earlier or later whorls than that of the holotype. The largest specimen measures 38.3 mm (Fig 18) (FF). In this specimen, the two denticles at the basal constriction are stronger; and an elongated callus has developed at the posterior end of the parietal wall (Fig19); moreover, it also has developed a strong swelling of the apertural lirations at the labral beginning of the anterior canal (Fig 20). The same apertural characters have been observed on three other fully mature specimens in the type series (KLS, EFG 28329). The operculum of two live-collected juveniles is yellow, with a terminal nucleus (Fig 21). The yellow coloring of the spiral cords fades to white in long- dead specimens.
There are three buccinid genera that look rather similar: *Manaria* Smith, 1906, *Eosipho* Thiele, 1929, and *Phaenomenella* Fraussen & Hadorn, 2006. The former two have been compared by Bouchet & Warén (1986). All three genera have been subsequently compared by Fraussen and Hadorn (2006: 103-104). I have placed the new species in *Manaria* because of its similarity with *Manaria thurstoni* Smith, 1906 (Bouchet & Warén, 1986: 478, pl. 13, fig. 86), a species from the northern Indian Ocean and the type species of *Manaria*. Although the new species does not have the distinct parietal tooth of the type species, it does have a somewhat bidentate callus in the same area, more readily visible in the largest specimen (Fig 20). *Manaria burkeae* is also similar to *M. thurstoni* in having almost straight-sided whorls, a channeled suture, a fusiform profile with a short, ovate aperture, and a strongly arched columella. Although the general shape and sculpture are similar to *Phaenomenella inflata* (Shikama, 1971), the new species lacks the strong angulation of the upper spire whorls, as well as the thickened lip characteristic of *Phaenomenella*.
The single western Atlantic species assigned to *Manaria* by Harasewych (1990: 126) is *M. fusiformis* (Clench & Aguayo, 1941). Although this species has not been reported in literature as inhabiting the Gulf of Mexico, I do have a specimen in my collection collected in the southeastern quadrant of the Gulf (Fig 23, EFG 13916). However, *M. fusiformis* grows to 85 mm, has a significantly smaller protoconch, is more

elongated, has a proportionately larger aperture with a less twisted columella, and lacks the apertural characters of *M. burkeae*.

Etymology. Named for Mrs. Alice Burke, of Fort Myers, Florida, an ardent shell collector who for 10 years unselfishly assisted the well –known malacologist Alan Solem with his work.

Genus ***Retimohnia*** McLean, 1995
Type species: *Mohnia frielei* Dall,1891 (by original designation)

Retimohnia acadiana n. sp.
Figs 24-26

Type material. Holotype ANSP 418029 length 20.9 mm, width 8.5 mm (Figs 24-25).

Type locality. 27°46.904'N 91°30.286'W, in 546-555 m; off Louisiana, "Bush Hill" hydrocarbon cold seeps

Distribution. Known only from the type locality.

Description. Holotype 20.9 mm in length, strong, fusiform (width/ length ratio 0.40) (Figs 24-25). Protoconch missing. Teleoconch of 5, slightly convex whorls. Suture narrowly channeled, undulating. Axial ornamentation of strong, rounded ribs; 13 such ribs on penultimate whorl; ribs as wide as interspaces, stretching from suture to suture on early whorls, evanescing below periphery of last whorl; vestiges of secondary axial threads appearing on less corroded surface of shell (Fig 26). Spiral ornamentation of an undulating thread at suture; vestiges of a supra-sutural thread also showing on less corroded surface of shell. Aperture elongate- ovate, less than half the length of shell; labrum thin; columella almost straight; anterior canal moderately long, curved to the left. Shell yellowish-brown.

Discussion. The genus *Retimohnia* was proposed by Mc Lean (1995: 40) for those *Mohnia*-like species whose axial sculpture of projecting ribs is the principal sculpture.Although the single specimen was collected as an empty shell and its surface has undergone some chemical corrosion, this new species has been placed in *Retimohnia* because of the strong conchological similarities with species assigned to that genus, as well as for its deep-water habitat. Judging by sculptural vestiges observed on the less corroded portions of the surface, the species does seem to have microscopic spiral ornamentation.

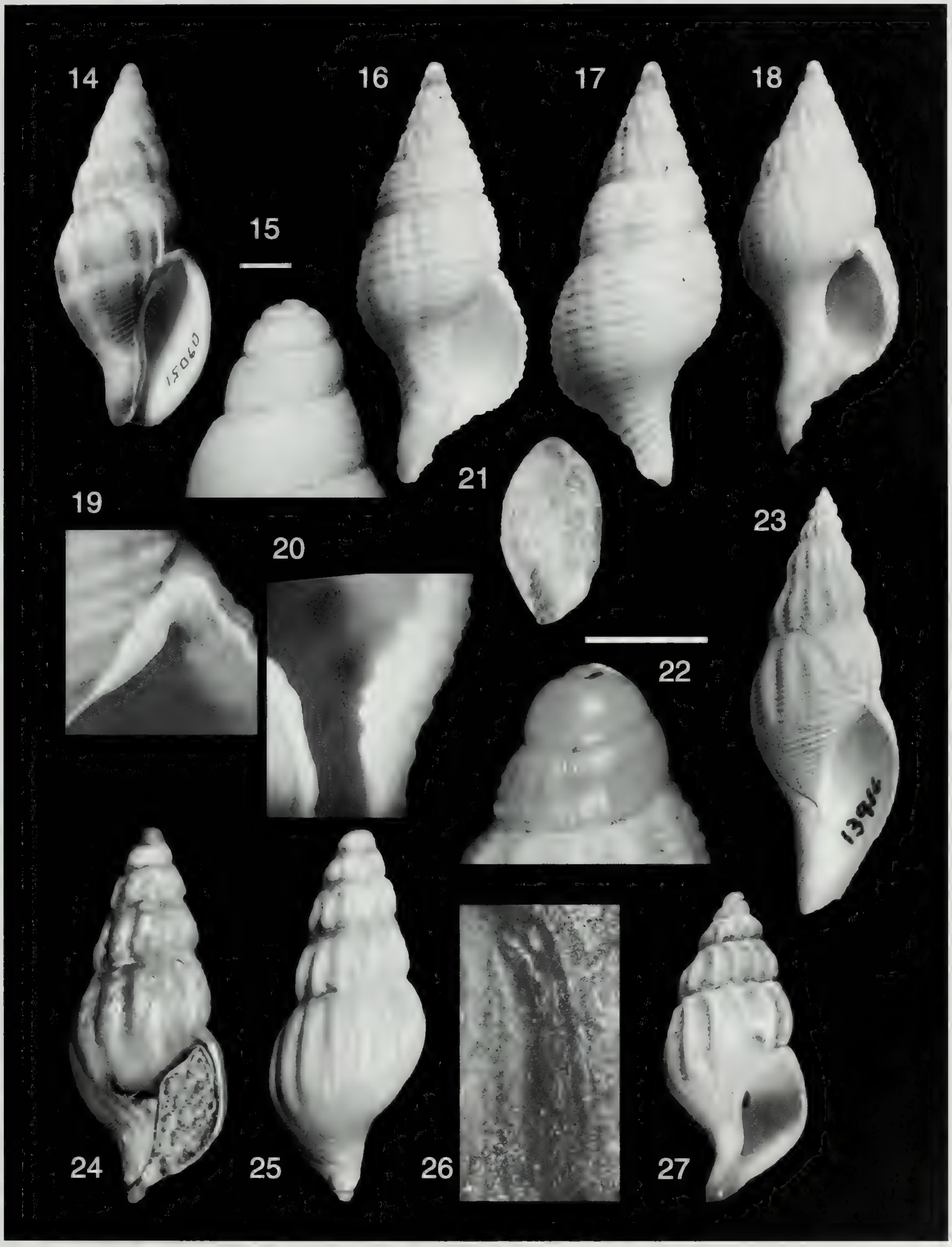
Three western Atlantic species have been placed by McLean in *Retimohnia*. *R. glypta* (Verrill, 1882), which inhabits the northeastern United States and Iceland, has a thinner shell, strong spiral ornamentation, and more convex whorls; and *R. carolinensis* (Verrill, 1884), found off North Carolina, grows to only 11 mm and has a strong axial and spiral ornamentation that forms knobs at intersections. The third species, *R. caelata* (Verrill, 1880), has almost the same distribution as *R. glypta*, and is the most similar to the new species.

Retimohnia caelata (Fig 27)) is a rather variable species. With numerous specimens at their disposal Bouchet and Warén (1985: 212) have demonstrated that *Sipho hebes* Verrill, 1884 and *Sipho obesus* Verrill, 1884, are ecological variations of *R. caelata.* Both of these forms are more globose than the new species, have less pronounced, more sinuous axial elements, and have strong spiral ornamentation. Some specimens of *R. caelata* from SE Delaware Bay (Bouchet & Warén, 1985: 214, fig. 548) have a smoother surface; however, the spiral ornamentation of this morph is still rather prominent, particularly on early whorls, the shell is more elongated, and the axial ribs are narrower, more sinuous. None of the forms of *R. caelata* have the secondary axial ornamentation present in *Retimohnia acadiana.*

Etymology. Named for Acadiana, the region of southwestern Louisiana settled by Acadian immigrants from Canada. Their wonderful descendants have greatly enriched the culture of the region.

Figures 14- 27

14- 15. *Bartschia significans* Rehder, 1943, south of Dry Tortugas in 210 m, 46.4 mm (EFG 15060b); **16- 22.** *Manaria burkeae* n. sp., 24°14'N, 82°09'W; approximately 37 kms southwest of KeyWest, Florida, in 200 m **16- 17.** Holotype ANSP 418034 length 33.5 mm, width 13.2 mm. **18-20.** Fully adult paratype, 38.3 mm (FF). **21- 22.** Operculum and protoconch of juvenile paratype showing terminal axial folds, 17.8 mm (FF). **23.** *Manaria fusiformis* (Clench & Aguayo, 1941), 24°14'N; 87°45'W, in approximately 500 m, 44 mm (EFG 13916); **24- 26.** *Retimohnia acadiana* n. sp. Holotype ANSP 418029 length 20.9 mm, width 8.5 mm, 27°46.904'N 91°30.286'W, in 546-555 m; off Louisiana, "Bush Hill" hydrocarbon cold seeps; **27.** *Retimohnia caelata* (Verrill, 1880), off Sable Bank, Nova Scotia, in 1200 m, 19 mm (HGL).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Description of a new *Muricopsis* species (Muricidae: Muricopsinae) from Northwest São Tomé

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KEYWORDS. West Africa, São Tomé, Gastropoda, Muricidae, *Muricopsis* n. sp.

ABSTRACT. *Muricopsis (Muricopsis) testorii* n.sp. is described from Lagoa Azul, NW São Tomé. It is compared with two other *Muricopsis* species, *Muricopsis (M.) cristata* (Brocchi, 1814) from the Mediterranean Sea and *Muricopsis (M.) josei* Vokes, 1994 from Brazil.

INTRODUCTION

There are currently 15 Recent *Muricopsis* s.s. species or subspecies occurring off West Africa: *M. (M.) fusiformis* (Gmelin, 1791), *M. (M.) rutilus* (Reeve, 1846), *M. (M.) suga* (Fischer-Piette, 1942), *M. (M.) seminolensis* Vokes & Houart, 1986, *M. (M.) fusiformis punctata* Houart, 1990, *M. (M.) suga discissus* Houart, 1990, *M. (M.) matildeae* Rolán & Fernandes, 1991, *M. (M.) principensis* Rolán & Fernandes, 1991, *M. (M.) rutilus mariangelae* Rolán & Fernandes, 1991, *M. (M.) gofasi* Houart, 1993, *M. (M.) annobonensis* Houart & Rolán, 2001, *M. (M.) haidari* Houart, 2003, *M. (M.) delemarrei* Houart, 2005, *M. (M.) hernandezi* Rolán & Gori, 2007, and *Muricopsis testorii* n.sp., here described.

Twelve of them were described since 1986, of which five occur in São Tomé: *M.(M.) matildae* (Playa de Esprainha), *M.(M.) rutilus mariangelae* (Ciudad de São Tomé), *M.(M.) delemarrei* (Ilha das Cabras), *M.(M.) hernandezi* (Lagoa Azul), and *M.(M.) testorii* n.sp.

As defined in Houart (2005), Merle & Houart (2003) restricted *Risomurex*, previously used to designate the West African species (Vokes & Houart, 1986a and 1986b, Houart, 1996, and other authors) to the West Atlantic species: *Muricopsis (Risomurex) deformis* (Reeve, 1846); *M. (R.) rosea* (Reeve, 1846); *M. (R.) schrammi* (Crosse, 1863), and *M. (R.) withrowi* Vokes & Houart, 1986.

Muricopsis (M) testorii n.sp. was collected for the first time by the junior author in 2007 on his fifth trip to São Tome. It lives in the dead coral *Tubastraea aurea* (Quoy & Gaimard, 1833) and is currently only known from the type locality (see Fig. 1). It is sympatric with *Muricopsis (M.) hernandezi* Rolán & Gori, 2007 (Muricidae), *Trachypollia turricula* (Maltzan, 1884) (Muricidae), *Coralliophila gilli* Kosuge, 1990, *Latiaxis bernardi* Nicolay, 1984 (Muricidae) and *Mitrella saotomensis* Rolán, 2005 (Columbellidae).

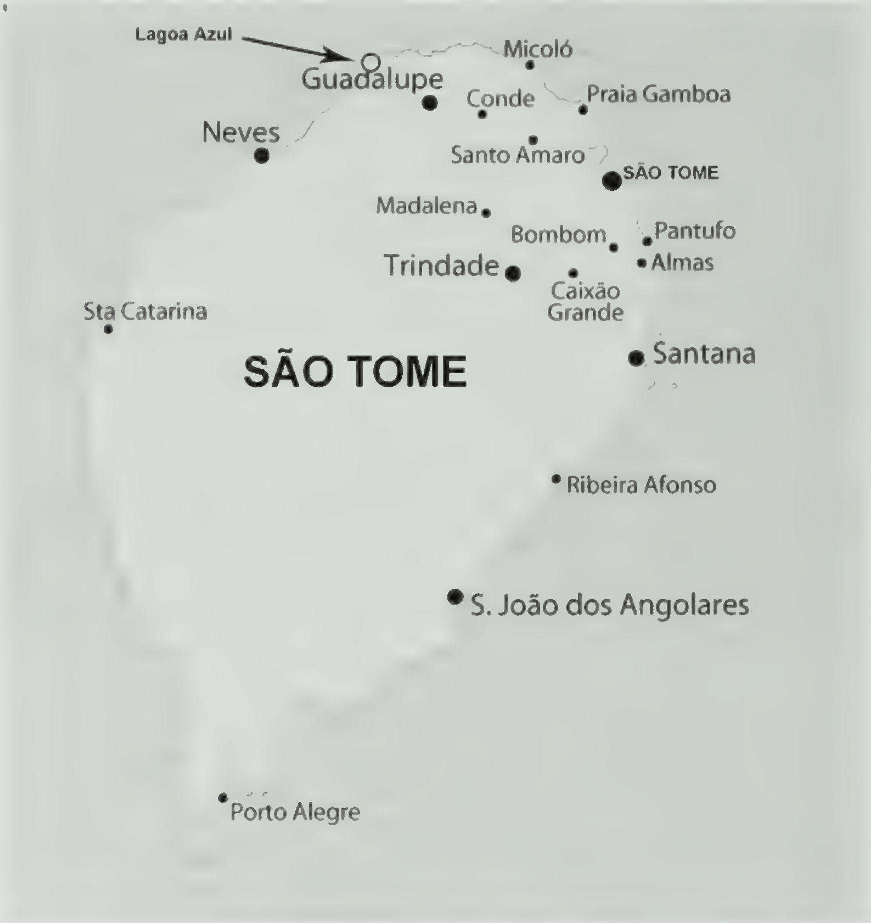
Abbreviations

IRSNB: Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgium.
MNHN: Muséum national d'Histoire naturelle, Paris, France.
RH: coll. Roland Houart.
dd: empty shell.
lv.: collected alive.

P :	Primary cord
s :	secondary cord
t :	tertiary cord
ad :	adapical
ab :	abapical
SP:	Subsutural cord
IP :	Infrasutural primary cord (primary cord on shoulder)
adis :	adapical infrasutural secondary cord (shoulder)

abis :	abapical infrasutural secondary cord (shoulder)
P1 :	Shoulder cord
P2-P6 :	Primary cords of the convex part of the teleoconch whorl
s1-s6 :	secondary cords of the convex part of the teleoconch whorl
example: s1 = secondary cord between P1 and P2; s2 = secondary cord between P2 and P3, etc.	
ADP :	adapical primary cord on the siphonal canal
ads :	adapical secondary cord on the siphonal canal
MP :	median primary cord on the siphonal canal
ms :	median secondary cord on the siphonal canal
ABP :	abapical primary cord on the siphonal canal
abs :	abapical secondary cord on the siphonal canal
APERTURE	
ID:	Infrasutural denticle
D1 to D6:	Abapical denticles

Table 1. Terminology used to describe the spiral cords and the internal denticles of the outer lip (based on Merle 1999, 2001, 2005 and Merle & Houart, 2003)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Almas
Caixão Grande
Sta Catarina
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Santana
Ribeira Afonso
S. João dos Angolares
Porto Alegre

Figure 1. Island of São Tomé and location of the type locality of *Muricopsis (M.) testorii* n.sp.

SYSTEMATICS

Family **MURICIDAE** Rafinesque, 1815
Subfamily **MURICOPSINAE** Radwin & D'Attilio, 1971
Genus ***Muricopsis*** Bucquoy & Dautzenberg, 1882
Subgenus ***Muricopsis*** Bucquoy & Dautzenberg, 1882
Type species by original designation: *Murex blainvillei* Payraudeau, 1826 (= *Murex cristatus* Brocchi, 1814). Recent; Mediterranean.

Muricopsis (Muricopsis) testorii n. sp.

Figs 2-4, 5-8

Type material. Northwest São Tomé, Lagoa Azul, 00°24.49' N, 06°36.43' E, offshore, 37 m, on dead corals, holotype IRSNB IG.31042/MT1977; 4 paratypes coll. S. Gori (1 complete adult, lv.; 1 damaged adult, dd; 2 juveniles, lv.); 1 paratype RH, 36 m, on a dead net; 1 paratype MNHN 21201, Minerio Reef, 00° 23.01' N, 06°46.22' E.

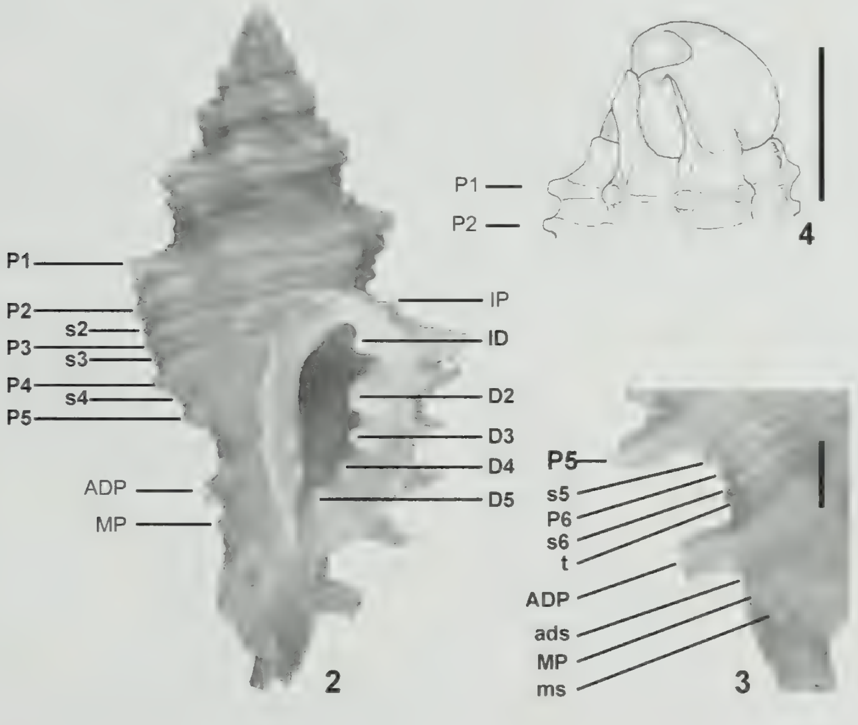
Distribution. Northwest São Tomé, Lagoa Azul and Minerio Reef, offshore, under rocks, under coral slabs, on small stones, 34-48 m.

Description. Shell medium sized for the genus, up to 20.8 mm in length at maturity (paratype S. Gori). Length/width ratio 1.95-2.10. Slender, lanceolate, weakly spinose, nodose. Shoulder weakly sloping, weakly concave. Bright, dark orange with white aperture and columellar lip. Spire high, acute with 1.25-1.5 protoconch whorls and up to 6 or 7 narrow, strongly shouldered, weakly spinose whorls. Suture impressed. Protoconch small, whorls rounded, minutely punctate at end of last whorl. Terminal lip thin, raised, weakly curved.

Axial sculpture of teleoconch whorls consisting of low, strong, broad, rounded varices with short, frondose, open primary and secondary spinelets, more strongly developed on last (apertural) varix. Other axial sculpture of numerous low growth lamellae. First and second teleoconch whorls with 8 or 9 varices, second to fifth with 8, penultimate with 6 or 7, last whorl with 6 varices. Spiral sculpture of high, strong, narrow, squamous, primary, secondary and tertiary cords. First whorl with visible P1-P2, or P1-P3, second and third with IP, P1-P3, fourth with IP, P1, P2, s2, P3, fifth and penultimate with adis, IP, abis, P1, P2, s2, P3. Last whorl with adis, IP, (t), abis, P1, P2, s2, P3, s3, P4, s4, (t), P5, s5, P6, ADP, ads MP, ms, followed by 2 or 3 threads. P1, P2, P4 and P5 broad, almost equal in size, P3 smaller, P6 very small, narrow, ADP large, MP small. Spiral cords more obvious at intersection with axial sculpture, giving rise to short spinelets, more obvious at apertural varix.

Aperture large, narrow. Columellar lip broad, strongly flaring, with 2 strong, high, elongate folds of same strength adapically, towards inside aperture. Columellar lip with weak, low, broad parietal tooth at adapical extremity. Anal notch deep, narrow. Outer lip erect, crenulate, with 5 strong denticles within: ID, D2 (D1-D2 fused), D3, D4, D5. D2 broadest, highest denticle; D3-D5 high, obvious, of approximately equal size, but only about one-third that of D2. Siphonal canal moderately long, narrow, straight, weakly dorsally recurved at tip.

Operculum dark brown, strongly ovate with subapical nucleus in lower right; attached surface with 9 growth lines and broad, callused rim. Radula unknown.



Figures 2-4. *Muricopsis (Muricopsis) testorii* n. sp.

2-3. Spiral sculpture and apertural denticle morphology (**2.** Holotype IRSNB IG31 042 MT1977, 18.8 mm; **3.** Scale bar: 1 mm).

4. Protoconch (paratype coll. S. Gori) (scale bar: 0.5 mm).

Remarks. *Muricopsis (M) testorii* n. sp. differs from *M. (M) cristata* (Brocchi, 1814), a Mediterranean species also known in the Eastern Atlantic from Portugal and the Canary Islands (Houart, 2001), in having a comparatively longer siphonal canal (26.4 – 26.9 % of total shell length *vs* 17.7 – 23.1 % in *M. cristata*), a narrower aperture with broader, more obvious denticles and a different spiral sculpture morphology. In *M. cristata* the spiral pattern is as follows: (adis), IP, abis, P1, (s1), P2, s2, P3, s3, P4, s4, P5, (s5), P6, ADP, (ads), MP (ms), ABP. P6 is very small, ADP and MP are large, ABP is smaller. These 3 cords decrease in strength abapically. The spiral morphology does not change in any forms of *M. cristata* (Figs 9-14).

In *M. testorii* n.sp. the spiral cord morphology is as follows (see above): adis, IP, (t), abis, P1, P2, s2, P3, s3, P4, s4, (t), P5, s5, P6, s6, t, ADP, ads, MP, ms, and 2 or 3 abapical threads. P3 is smaller, P6 is very small, ADP larger, MP small, and ABP missing.

M. testorii n.sp. differs from *M. (M.) josei* Vokes, 1994 (Figs. 15-16), a Brazilian species, in being more squamous, narrower and comparatively smaller with the same number of teleoconch whorls, in having a longer siphonal canal (26.4 – 26.9 % of total shell length *vs.* 16.4 - 24.6 % in *M. josei*), in having narrower, more blunt spines, a narrower aperture with more obvious denticles, broader primary spiral cords and narrower secondary cords with a slightly different pattern. In *M. josei* the spiral cord pattern is as follows: IP, abis, P1, P2, s2, P3, t, s3, P4, t, s4, t, P5, t, s5, P6, s6, ADP, ads, t, MP, ABP. P3 is weakly smaller than P1, P2 and P4, like in *M. testorii* n.sp., and P6 is also very small when present. However, ADP and MP are large and ABP small, while in *M. (M.) testorii* only ADP is large. Two juveniles of each species with 4 teleoconch whorls confirm these differences.

Other *Muricopsis* species are quite different and don't need to be compared here.

Etymology. Named after Jean-Louis Testori, owner and director of the diving center Club Maxel, the diving base of the junior author in São Tome.

Acknowledgements. The junior author thanks the diving masters of the Club Maxel, Edmilson Augusto and Apolo Pires, whose patience and skill were of a big help during his researches. Thanks also to Marco Oliverio (Department of Animal and Human Biology, University of "La Sapienza", Rome, Italy), for his advice about Coralliophilinae, to John Wolff, Lancaster, Pennsylvania, USA, for checking the English text, and to the referee, Didier Merle, for his useful remarks.

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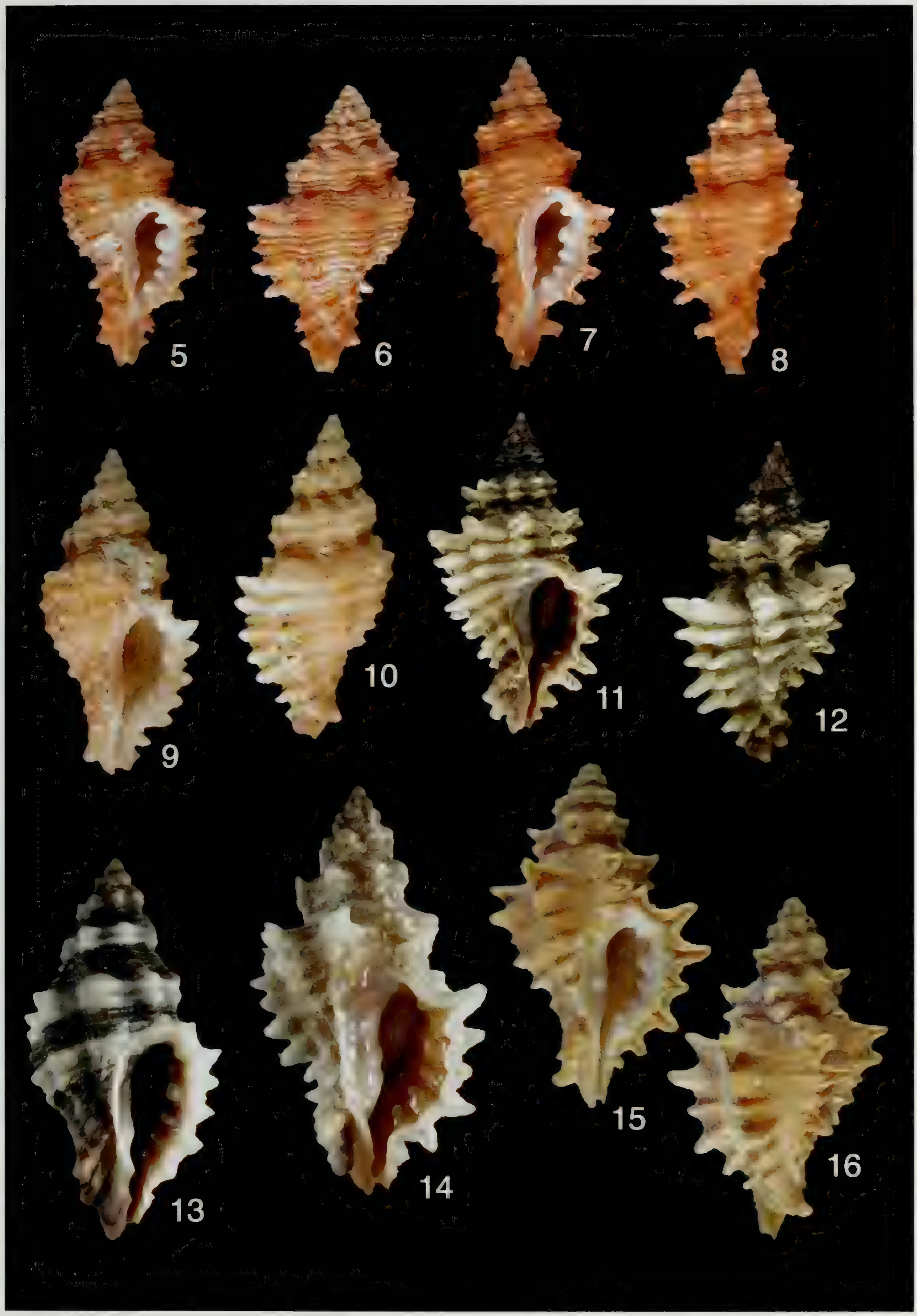
Figures 5-16

5-8. *Muricopsis (Muricopsis) testorii* n.sp.
5-6. Lagoa Azul offshore, NW São Tomé, 37 m, on dead corals, 18.8 mm, holotype IRSNB IG31042/MT1977;
7-8. 20.8 mm, paratype coll. S. Gori.
9-14. *Muricopsis (M.) cristata* (Brocchi, 1814)
9-10. Almeria, Italy, RH, 22.6 mm; **11-12.** Croatia, Crès Is., Punta Kriza, 0.5 m, RH, 22.15 mm; **13.** Tunisia, Kerkennah, RH, 27.7 mm; **14.** Croatia, peninsula, 10 kms from Ston, RH, 30.9 mm.
15-16. *Muricopsis (M.) josei* Vokes, 1994. Off Guarapari, Espirito Santo State, Brazil, RH, 28. 5 mm.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Two new species of the family Cornirostridae (Gastropoda: Heterobranchia: Valvatoidea) from Senegal (West Africa)

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KEY WORDS. Cornirostridae, *Tomura*, West Africa, Senegal, new species.

ABSTRACT. Two new species of the genus *Tomura* collected in sediment from Dakar are described and compared with the species previously known from West Africa. A list of the species of Cornirostridae is compiled with indication of the distribution area.

INTRODUCTION

The genus *Tomura* was described by Pilsbry & McGinty (1946) as a subgenus of *Vitrinella* due to the great similarity in the characters of their shells. They figured the animal of the new species *Tomura bicaudata* with an anteriorly bifurcated foot.

Moore (1964) doubted the placement of this genus in Vitrinellidae because of the scarce presence of the cephalic tentacle represented in the original figure (Pilsbry & McGinty, 1946).

Ponder (1990: 554) introduced the family Cornirostridae with two monotypical genera: *Cornirostra* (type species *Microdiscula pellucida* Laseron, 1954) and *Tomura* [type species *Vitrinella* (*Tomura*) *bicaudata* Pilsbry & McGinty, 1946], giving no formal diagnosis of the genera, but showing numerous morphological differences and similarities with freshwater Valvatidae.

Warén, Gofas & Schander (1993: 2) presented the morphologic characters of Cornirostridae, discussing and correcting the radular characteristics of *Skeneopsis pellucida* (Laseron, 1954) and *Tomura bicaudata,* assigning *Skeneopsis pellucida* to the genus *Xenoskenea* Warén & Gofas, 1993, which is included in the family Hyalogyrinidae Warén & Bouchet, 1992.

Rubio & Rolán (1998) described *Tomura xenoskenoides* from Yucatan, Mexico, presenting anatomical and radular information.

Bieler, Ball & Mikkelsen (1998) described *Cornirostra floridana* from Florida Cays (USA), adding a detailed anatomical study. The anatomical and morphological characters of the shell of the animal of the seven species known from live taken specimens were shown in a table, and the generic and family diagnosis were discussed. The shells and soft parts of the family were redefined: "small (<2.3 mm) valvatoideans with (almost) smooth skeneiform teleoconchs of 2-3 more-or-less convex whorls and simple peristome, and (weakly) sinistral protoconchs coiling around the same axis (this larval hyperstrophy might not be expressed if only protoconch I (embryonic shell) is present, e.g., *Noerrevangia*); snout long, with two tentacle-like oral lobes; radula with 7-9 teeth per row including 2-3 partly overlapping lateral teeth, and rachidian with highly developed lateral support; foot with propodial and metapodial extensions, cleft anteriorly and posteriorly; single right pallial tentacle; bipectinate, basally attached gill; hermaphroditic reproductive system with cephalic penis".

The first species of the genus *Tomura* recorded for the North African coast by Rubio-Salazar (1990) was *Oxystele depressa* Granata, 1877 (from which *Tharsiella tinostomoides* Fekih & Gougerot, 1977 is a synonym). It is a typically Mediterranean species, Rabat (Morocco) being its southernmost record. Fukuda & Yamasita (1993) described two new species from Japan.

There were no new additions to the genus until Rolán & Rubio (1999) described *Tomura abscondita* as a new species from the Cape Verde Archipelago.

In sediment samples collected in recent years by the senior author, several shells of two unidentified species of *Tomura* were found. Being different from the previously known species, they are described as new for science.

Abbreviations

AMNH: American Museum of Natural History, New York, USA.
BMNH: The Natural History Museum, London, UK.
MHNS: Museo de Historia Natural "Luis Iglesias", Santiago de Compostela, Spain.
MNHN: Museum national d'Histoire naturelle, Paris, France.
MNCN: Museo Nacional de Ciencias Naturales, Madrid, Spain.
MCZ: Museum of Comparative Zoology, Cambridge, U.K.
USNM: National Museum of Natural History, Washington D. C., USA.
ZSM: Zoologische Staatssammlung, München, Germany.
CJH: collection of José María Hernández, Gran Canaria.

SYSTEMATICS

Subclass **HETEROBRANCHIA**
Superfamily **VALVATOIDEA** Gray, 1840
Family **CORNIROSTRIDAE** Ponder, 1990
Genus ***Tomura*** Pilsbry & McGinty, 1946
Type species: *Vitrinella (Tomura) bicaudata* Pilsbry & McGinty, 1946 by monotypy.

Diagnosis (after Pilsbry & McGinty, 1946). Shell orbicular, depressed, polished, last whorl rounded at the periphery; umbilical region covered with a large, flat callus; aperture transverse, rounded, greatly produced and elongated, ending anteriorly in a slightly canaliculate point; inner lip smooth, callous, not emarginate or truncate anteriorly; outer lip thin, simple, not marginated or reflected.

Remarks. According to Warén et al. (1993), the species of Cornirostridae are nearly similar to those of Vitrinellidae in shell characters. Some species, like *Tomura depressa* can be recognized as belonging to Heterobranchia, by their heterostrophic larval shell, but a radular study is required to confirm its family placement. This character is more evident in some species of the genus *Tomura* (as T. *depressa* and *T. ascondita*) and less so in *T. bicaudata*.

Tomura sphaerica sp. nov.
Figs 1-13

Type material. Holotype (Fig. 1) deposited in the MNCN 15.05/47.523. Paratypes in the following collections: 1 (Fig. 5) AMNH, 1 BMNH 20080187, 1 (Fig. 4) USNM 1112470, 1 ZSM, 1 CJH, 2 (Figs. 2-4, 6-9) MHNS, all of them from the type locality; 2 MNHN 20845, from Ivory Coast.

Type locality. Senegal, Dakar Bay, between 15 and 40 m.
Etymology. The specific name refers to the almost spherical shape of the shell.

Description. Shell (Figs 1-9) small, rather sturdily built, almost spherical, subovate in outline, weakly depressed, quite smooth, slightly glassy, white. The upper surface is convex. The protoconch (Figs 10-11), hyperstrophic, small, with ¾ of whorl, apparently smooth; its diameter is of about 190 μm. Protoconch I partially visible, separated from the Protoconch II by a strong axial rib. The teleoconch has between 2.15-2.25 whorls in adult specimens. The spire increases uniformly. The suture is clear but not deep and a slight depression appears below it. The aperture (Fig. 1) is almost circular, slightly pyriform; the columella strongly curved, a little angled and opisthocline. There is a short callus which totally covers the umbilicus. The apertural border is sharp and the peristome continuous, a little wider at the base. The surface of the shell is covered with numerous very fine spiral striae, and axial growth lines which form some folds near the base. Under high magnification there can be seen that the spiral striation is formed by very small, impressed, irregular and poorly limited cords (Figs 12-13) which are more evident on the upper part of the whorls.
Holotype: height 0.84 mm, width 0.94 mm. Dimensions of the largest specimens 1.0 x 1.1 mm.
Soft parts unknown.

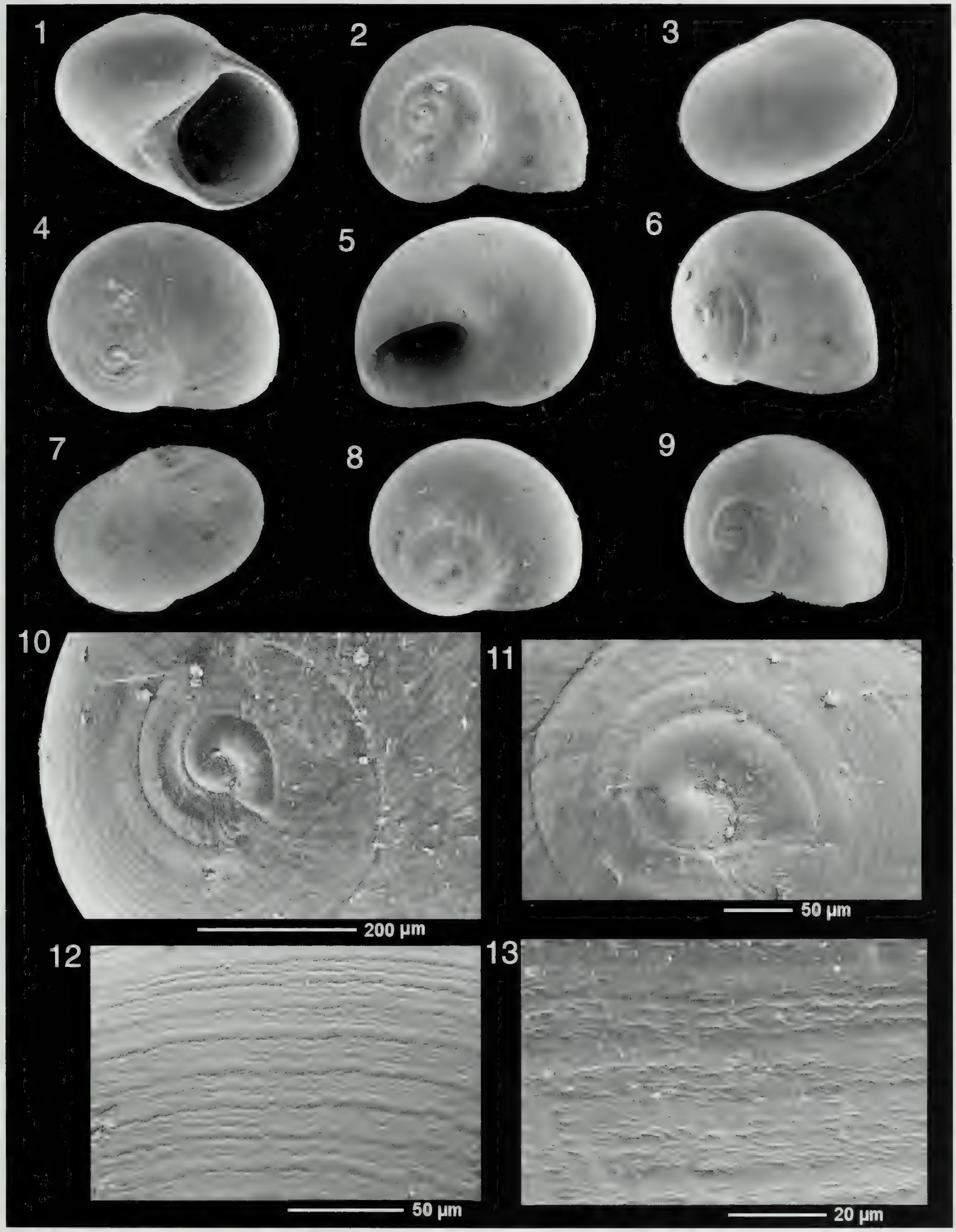
Remarks. *Tomura sphaerica* differs from *T. depressa*, by its smaller size, the more globose shape of its shell and by having its entire surface covered by spiral threads.
It can be separated from *T. abscondita* because the callus formed by the thickening of its internal lip completely covers the umbilicus.
It differs from *T. bicaudata* by its sculpture and the lack of a periumbilical cord.

Tomura umbiliobsessa sp. nov.
Figs 14-23

Type material. Holotype (Fig. 14) deposited in the MNCN 15.05/47.524. Paratypes in the following

Figures 1-13. *Tomura sphaerica* sp. nov., Dakar, Senegal.

1. holotype, 0.94 mm (MNCN 15.05/47.523); **2-3.** paratypes, 1.09, 0.98 mm (MHNS); **4.** paratype, 1.05 mm (USNM); **5.** paratype, 1.03 mm (AMNH); **6-9.** paratypes, 1.10, 1.05, 0.96, 1.01 mm (MHNS); **10-11.** protoconch; **12.** microsculpture on the shell on its dorsal part; **13.** microsculpture in ventral part.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collections: 1 (Fig. 16) AMNH; 1 BMNH 20080188; 1 MNHN 20844; 1 USNM 1112469; 1 ZSM; 3 CJH and 4 (Figs. 17-20) MHNS. All from the type locality.

Type locality. Senegal, Dakar Bay, between 20 and 40 m.

Etymology. The specific name is formed by the fusion of the two Latin words, *umbilicus* and *obsessa* "which makes blockade", alluding to the partial obstruction of the umbilicus by the callus.

Description. Shell (Figs 14-20) small, sturdily built, depressed, smooth, not glassy, dorsally with a circular outline, whitish. The hyperstrophic protoconch (Fig. 21), is small with about one apparently smooth whorl, with a diameter of about 160 µm. The teleoconch is about 2.25 whorls in adult specimens. The last whorl is regularly convex and the spire is only very slightly elevated. The suture is evident but shallow. The aperture is almost circular, the columella is regularly curved. It spreads both towards the base and the umbilicus, more noticeably in mature specimens. The umbilicus is not covered, being limited by a prominent fold of the widened columella. The apertural border is narrow except in the place of the two enlargements. The external surface (Figs 22-23) of the shell, seems smooth, but when magnification it becomes obvious that it is totally covered with small threads, more evident on the lower part of the shell, with pits in the intervals. These threads are crossed by growth lines.
Holotype: height 0.8 mm, width 1.04 mm. Largest specimen: 1.15 mm width.
Soft parts unknown.

Remarks. The general aspect, protoconch, columella and inner lip of this species are very similar to those of *Tomura bicaudata*, from which it is different by its smaller size and microsculpture formed by spiral threads with small pits in their interspaces.
It can be separated from T. *depressa* by its smaller size, the peculiar microsculpture and an open umbilicus not totally covered by callus.
From *T. abscondita* it can be separated by its microsculpture and a more evident periumbilical angulation.
From T. *sphaerica*, for being less globose, having an open umbilicus and small pits in the microsculpture.

Discussion

The species known in the family Cornirostridae are the following:

Cornirostra pellucida (Laseron, 1954)- Mediterranean.
Cornirostra floridana Bieler & Mikkelsen, 1998- Florida Keys, USA.

Tomura bicaudata (Pilsbry & McGinty, 1946)- Florida Keys, USA.
Tomura xenoskenoides Rubio & Rolán, 1998- Yucatán, Mexico.
Tomura depressa (Granata,1877)- Mediterranean Sea, W. Africa.
Tomura abscondita Rolán & Rubio, 1999- Cape Verde Archipelago.
Tomura sphaerica spec. nov.- Senegal.
Tomura umbiliobsessa spec. nov.- Senegal.
Tomura yashima Fukuda & Yamashita, 1997- Seto Inland Sea, Japan.
Tomura himeshima Fukuda & Yamashita, 1997- Seto Inland Sea, Japan.
Noerrevangia fragilis Warén & Schander, 1993- Faroe Islands.

Hyalogyrinidae
Xenoskenea pellucida (Monterosato, 1874)- Mediterranean.

ACKNOWLEDGEMENTS

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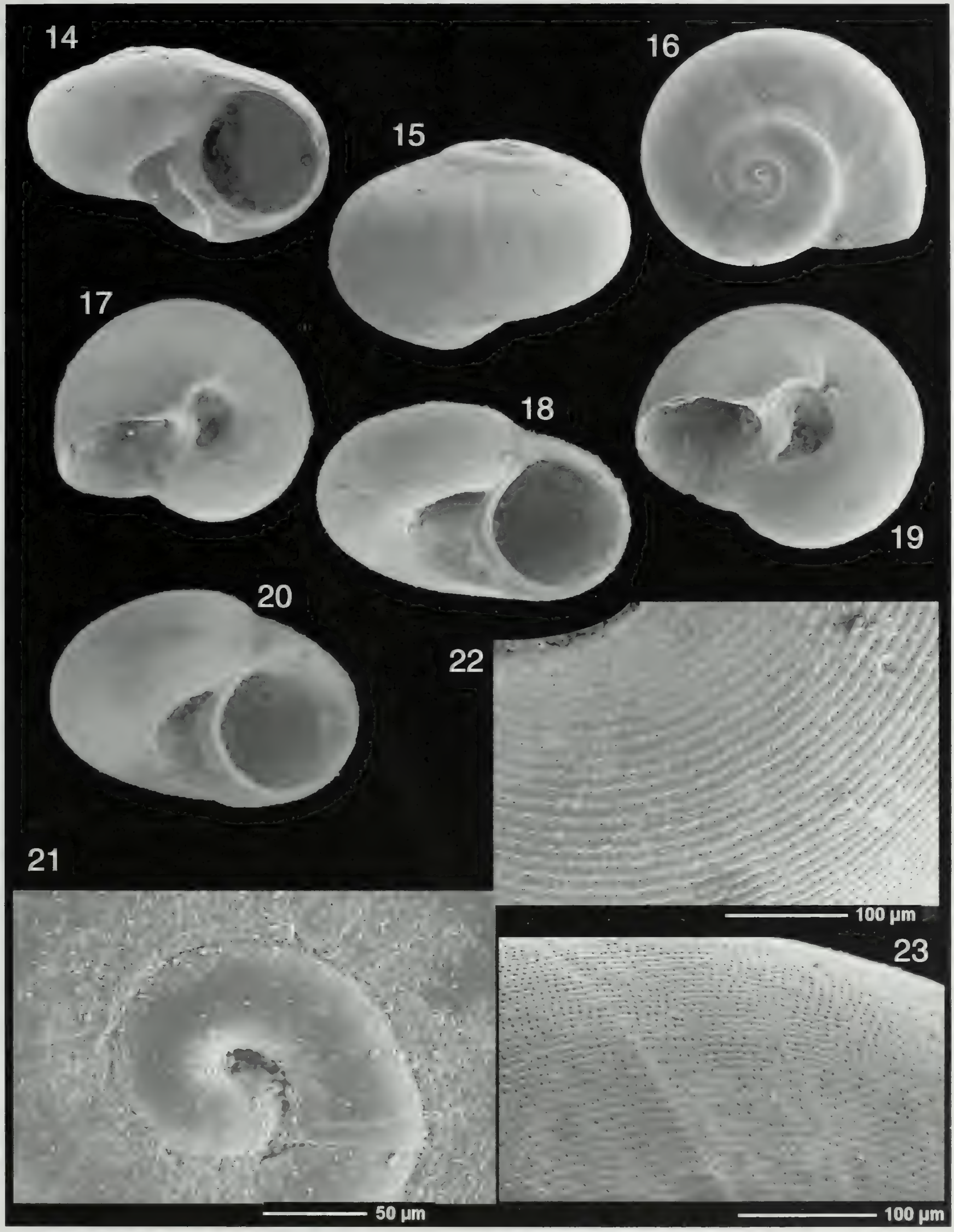
Figures 14-23. *Tomura umbiliobsessa* spec. nov., Dakar, Senegal.

14. holotype, 1.04 mm (MNCN 15.05/47.524); **15.** paratype, 1.06 mm (CJH); **16.** paratype, 1.15 mm (AMNH); **17.** paratype, 0.95 mm (MHNS); **18.** paratype, 1.10 mm (MHNS); **19.** paratype, 1.05 mm (MHNS); **20.** paratype, 0.90 mm (MHNS); **21.** protoconch; **22.** microsculpture of ventral part; 23. microsculpture of dorsal part.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A new species of *Fulgoraria* Schumacher, 1817 (Gastropoda: Volutidae) from the bathyal Taiwanese water

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KEYWORDS. Gastropoda, Volutidae, East China Sea, *Fulgoraria* (*Fulgoraria*) *kaoae* sp. nov.

ABSTRACT. A new species from the southern part of the East China Sea is described here and compared with related species of the same subgenus *Fulgoraria* sensu stricto.

INTRODUCTION

Around the mid 1980s, the start of commercial trawling revealed the high biodiversity of this area. It also brought to light many well-differentiated populations of Fulgorariinae along various parts of the continental slope along the East China Sea as well as the South China Sea.
Since the comprehensive work of Shikama (1967), bathyal trawling in those areas has led to the discovery of seven new species: *Fulgoraria* (*Fulgoraria*) *ericarum* Douté, 1997 from Vietnamese waters; *F.* (*Saotomea*) *minima* Bondarev, 1994, *F.* (*Fulgoraria*) *leviuscula* Rehder, 1969 (= *F. glabra* Habe & Kosuge, 1970) and *F.* (*Musashia*) *allaryi* Bail, 2005 from the South China Sea; *F.* (*Saotomea*) *pratasensis* Lan, 1997 from off Ryukyu Islands; *F.* (*S.*) *solida* Bail & Chino, 2000 and *F.* (*Musashia*) *chinoi* Bail, 2000 from the southwestern waters of Kyushu (Japan). As a byproduct of fisheries, large numbers of various *Fulgoraria* are now offered on the shell markets. Among them, a species so far unnamed is described here.

Abbreviations

MNHN: Muséum national d'Histoire naturelle, Paris, France.

Family **VOLUTIDAE** Rafinesque, 1815
Subfamily **FULGORARIINAE** Pilsbry & Olsson, 1954
Genus ***Fulgoraria*** Schumacher, 1817
Subgenus ***Fulgoraria*** sensu stricto
Type species *Fulgoraria chinensis* Schumacher, 1817, = *Voluta rupestris* Gmelin, 1791 (by original designation) Recent, Japan.

Fulgoraria (***Fulgoraria***) ***kaoae*** sp. nov.
Figs 1, 2-16

Type material. Holotype length: 72.8 mm, width: 23.9 mm. MNHN 20984. Paratype length: 54,1 mm, width: 17.8 mm, juvenile specimen. MNHN n° 20985.

Other material. Three specimens in P. Bail collection: 76.4 mm x 25.2 mm, 79.5 mm, x 25.6 mm, 84.6 mm x 25.8 mm, one in A. Limpus collection: 83.3 mm x 27.3 mm, all from the reported type locality.

Type locality. Northern bathyal waters off Taiwan, off Keelong at 60-150 m depth.

Range. Northern Taiwan. The exact range is only known by convergent information, fishermen being reluctant to give their exact spots. Since it seems to have been discovered only recently, a restricted distribution is suspected.

Habitat. Not given, but most specimens are stained by a black muddy layer.

Description. Shell small for the genus, 80-100 mm, light but solid, narrowly fusiform with a high spire. Surface semi-glossy. Protoconch bulbous, of 2.5 smooth whorls deviated at 45° from axis of shell, with an average diameter of 4.2 mm, bearing a raised brown calcarella. Transition protoconch - teleoconch gradually marked by occurrence of faint axial costae. Teleoconch of 4.5 slender shouldered whorls, sculptured by 12-13 almost straight, keel-like axial ribs well marked on first 3 whorls, extending from suture to suture on the spire, becoming obsolete at the middle of body whorl, then disappearing on the last half. Spiral sculpture of close-set faint threads extending onto the whole teleoconch without noticeable variation of interspaces. Suture slightly indented without callus deposit. Aperture narrow, slit-like, forming an average of 65% of total shell length. Columella almost straight, bearing a raised row of 7-8 oblique plaits covered by thick porcelainous callus. Inner lip covered by a thin translucent layer of enamel. Fasciole absent. Siphonal notch very shallow. Background color uniformly flesh-colored overlain by a pattern of rather thin axial brown lines irregularly parallel, sometimes wavy, extending onto the entire teleoconch. Protoconch beige with a brown calcarella, columellar plaits white.
Animal unknown.

Discussion. By its very specific characters such as small adult size, slim shape, protoconch with a prominent brown calcarella, columellar plaits almost buried beneath thick white callus, *F. kaoae* is easily distinguished.

It belongs to the subgenus *Fulgoraria* defined by globose protoconch, elongate shape sculptured by solid axial ribs, 6 to 9 plaits, pattern of well-defined axial lines (Bail, 2000).

Fulgoraria kaoae can be compared with the other species of this subgenus:

- *Fulgoraria (Fulgoraria) ericarum* Douté, 1997 is a large heavy species, most adults often over 200 mm long, protoconch without calcarella, deeper spiral sculpture close-set below the suture, beige columellar plaits without callus, very open pattern. (Figs 23-24).
- *Fulgoraria (Fulgoraria) hamillei* (Crosse, 1869) is larger, most adults often over 130 mm, strongly shouldered, protoconch rounded, spiral threads prominent, columellar plaits without callus, confused zigzag pattern divided into 3 parts on the body whorl. (Figs 17-18).
- *Fulgoraria (Fulgoraria) humerosa* Rehder, 1969 is larger, often over 170 mm, shoulders very angled, protoconch of variable shape, spiral threads crossed by axial grooves giving a deep cancellate subsutural surface, pattern of wavy close-set axial lines. (Figs 21-22).
- *Fulgoraria (Fulgoraria) leviuscula* Rehder, 1969 is larger, often over 130 mm, surface smooth and glossy, pattern of thick irregular axial lines. (Figs 25-26).
- *Fulgoraria (Fulgoraria) rupestris* (Gmelin, 1791) is the closest to *F. kaoae*. It differs by its larger size, heavier structure, protoconch rounded without calcarella, sculpture of deep spiral grooves becoming wider spaced on the central part of the body whorl, columellar plaits without callus, pattern of axial lines thicker and slightly more wavy. (Figs 19-20).

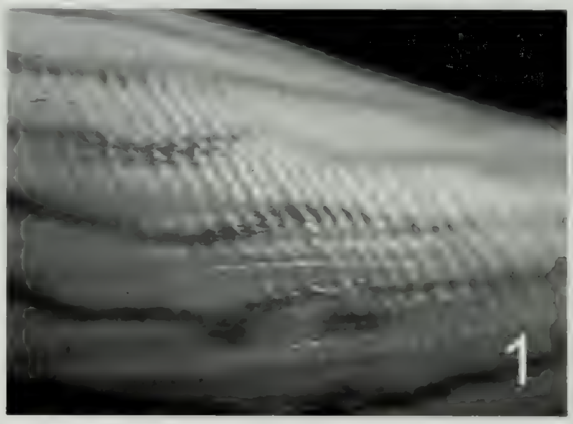

Fig. 1. *Fulgoraria* (*Fulgoraria*) *kaoae* sp. nov. Detail of spiral sculpture.

Remarks. One could argue that this species may not be a new discovery but remained unnamed because of confusion with juvenile *F. rupestris*. The brown pigmentation of the pattern is very fragile and easily eroded.

Etymology. Named in honor of Mrs. Ren Teresa Kao from Taiwan, who provided the material for study and donated the holotype to the MNHN.

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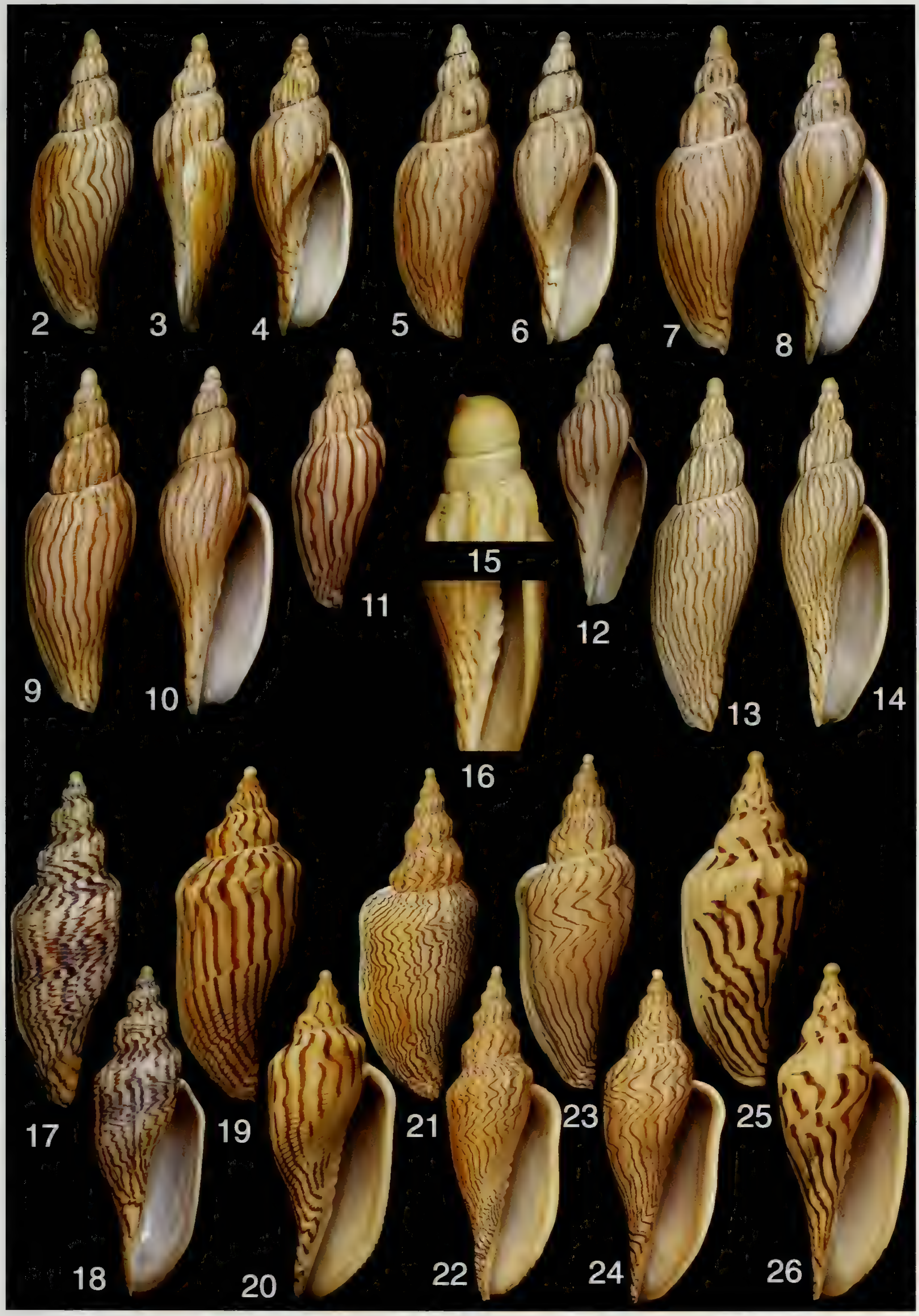
Figures 2-26

Figures 2-16. *Fulgoraria (Fulgoraria) kaoae*.
2-4. holotype MNHN 20984, length 72.8 mm, width 23.9 mm; **5-6.** length 76.4 mm, width: 25.2 mm; **7-8.** length 83.3 mm, width: 27.3 mm; **9-10.** length 79.5 mm, width: 25.6 mm; **11-12.** paratype MNHN 20985, length: 54,1 mm, width: 17.8 mm; **13-14.** length 84.6 mm, width: 25.8 mm. **15.** protoconch (x3); **16.** columellar plaits.

Other species of the subgenus *Fulgoraria*.

17-18. *Fulgoraria (Fulgoraria) hamillei hamillei* (Crosse, 1869), 158 mm, East China Sea. **19-20.** *F. (F.) rupestris rupestris* (Gmelin, 1791), 125.6 mm, Taiwan; **21-22.** *F. (F.) humerosa* Rehder, 1969, 182.0mm, South China Sea; **23-24.** *F. (F.) ericarum* Douté, 1997, 184.1 MM, South China Sea; **25-26.** *F. (F.) leviuscula* Rehder, 1969, 132.5 mm, South China Sea.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Description of a new species of *Chicoreus* (*Triplex*) Perry, 1811 (Gastropoda: Muricidae) from Palawan, Philippine Islands

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KEYWORDS. Philippine Islands, Palawan, *Chicoreus (Triplex) jessicae* n. sp.

ABSTRACT. *Chicoreus (Triplex) jessicae* n. sp. is described from Balabac Island, South Palawan in the Philippine Islands. *Chicoreus torrefactus* (Sowerby, 1841), a remarkable sibling species, has a different larval development. *C. jessicae* differs also from *C. torrefactus* in other characteristic which confirms their separation.
The new species is also compared with *C. (T.) microphyllus* (Lamarck, 1822), *C. (T.) akritos* Radwin & D'Attilio, 1976 and *C. (T.) banksii* (Sowerby, 1841).

INTRODUCTION.

Five new Recent species of *Chicoreus (Triplex)* from the Indo-West Pacific were described since the revision of the genus (Houart, 1992): *C. (T.) dodongi* Houart, 1995, from the Philippines, *C. (T.) monicae* Bozzetti, 2001, from Madagascar, *C. (T.) setionoi* Houart, 2001, from the Arafura Sea, *C. (T.) allaryi* Houart, Quiquandon & Briano, 2004, from Madagascar, and *C. (T.) pisori* Houart, 2007, from Christmas Is., Line Islands, (Pacific). None of them are related to the new species here described.
Fourteen species of *Triplex* are currently known from the Philippines: *C. (T.) aculeatus* (Lamarck, 1822), *C. (T.) akritos* (Radwin & D'Attilio, 1976), *C. (T.) axicornis* (Lamarck, 1822), *C. (T.) banksii* (Sowerby, 1841), *C. (T.) brunneus* (Link, 1807), *C. (T.) cnissodus* (Euthyme, 1889), *C. (T.) dodongi* Houart, 1995, *C. (T.) microphyllus* (Lamarck, 1816), *C. (T.) nobilis* Shikama, 1977, *C. (T.) palmarosae* (Lamarck, 1822), *C. (T.) saulii* (Sowerby, 1841), *C. (T.) strigatus* (Crosse, 1861), *C. (T.) torrefactus* (Sowerby, 1841) and *C. (T.) jessicae* n. sp., described here.
Chicoreus akritos was considered a synonym of *C. microphyllus* in my revision (Houart, 1992: 59). However, new elements and the discovery of that species in the Philippine Islands where it apparently does not intergrade with *C. microphyllus* have changed my opinion about that form, which I now consider as a valid species. On the other hand, I still consider *C. crocatus* (Reeve, 1845) a synonym of *C. banksii*.
The shell illustrated in Houart (1992: fig. 318) from the Philippines as *C. microphyllus*, without any other locality data, is a specimen of *C. jessicae* n. sp.

Abbreviations

MNHN: Muséum national d'Histoire naturelle, Paris, France.
IRSNB: Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgium.
JPB: collection of Jean-Pierre Barbier.
RH: collection of the author.
dd: empty shell.
lv.: collected alive.

P :	Primary cord
s :	secondary cord
t :	tertiary cord
ad :	adapical
ab :	abapical
P1 :	Shoulder cord
P2-P6 :	Primary cords of the convex part of the teleoconch whorl
s1-s6 :	secondary cords of the convex part of the teleoconch whorl
example: s1 = secondary cord between P1 and P2; s2 = secondary cord between P2 and P3, etc.	
ADP :	adapical primary cord on the siphonal canal
ads :	adapical secondary cord on the siphonal canal
MP :	median primary cord on the siphonal canal

ms :	median secondary cord on the siphonal canal
ABP :	abapical primary cord on the siphonal canal
abs :	abapical secondary cord on the siphonal canal
APERTURE	
ID:	Infrasutural denticle
D1 to D5:	Abapical denticles

Table 1. Terminology used to describe the spiral cords and the internal denticles of the outer lip (based on Merle 1999 and 2001).

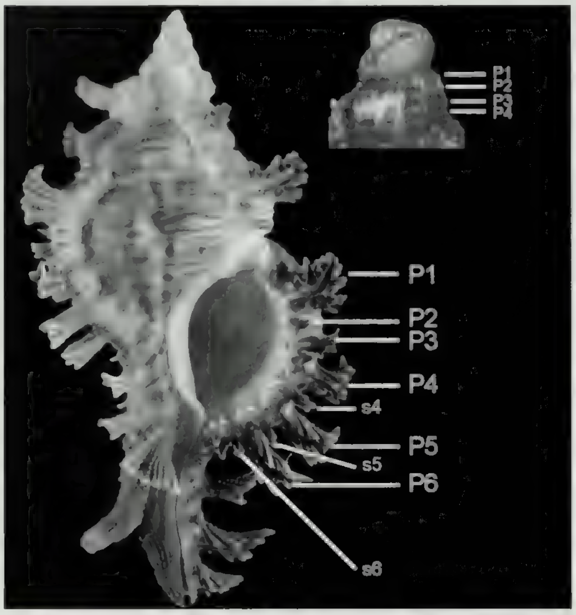


Fig. 1. Spiral cords morphology of *C. (T.) jessicae* n. sp.

SYSTEMATICS

Family **MURICIDAE** Rafinesque, 1815
Genus **Chicoreus** Montfort, 1810
Subgenus **Triplex** Montfort, 1810
Type species by monotypy: *Triplex foliatus* Perry, 1810 (= *Murex palmarosae* Lamarck, 1822)

Chicoreus (Triplex) jessicae n. sp.

Figs 1, 6-12

Type material. Holotype MNHN 21054, 1 paratype IRSNB IG 31128, 2 paratypes JPB, 2 paratypes RH (all from the type locality).

Type locality. Philippine Islands, South of Palawan, Balabac Island.

Description. Shell large, up to 76.5 mm in length at maturity (paratype JPB). Length/width ratio 1.8-1.9. Biconical, narrowly ovate, heavy, spinose. Shoulder strongly sloping, weakly convex.

Tan, light tan, or dark brown, occasionally with darker or lighter coloured spire whorls. Primary, secondary and tertiary cords topped with brown. One specimen (paratype JPB) and one specimen (RH) entirely dark orange. Aperture yellowish, columellar lip pale yellow or light orange.

Spire high with 1.5 protoconch whorls and up to 7 or 8 weakly shouldered, spinose and nodose whorls. Suture adpressed.

Protoconch large, broad, bulbous, with broad first whorl (Figs 2, 12); terminal lip unknown (eroded).

Axial sculpture of last teleoconch whorls consisting of high, broad, rounded varices, each with 6 frondose, open, primary spines, and some secondary spinelets. Other axial sculpture of 2 low, rounded, intervarical ribs with strong node on adapertural rib. Shoulder spine broadest, usually longest. First teleoconch whorl with 10 or 11 ribs, second whorl starting varices with 3 intervarical ribs, third whorl with 3 varices and 3 intervarical ribs, fourth to last whorl with 3 varices and 2 intervarical ribs.

Visible part of first to penultimate whorls with 4 primary cords (P1-P4). P4 occasionally partially covered with next whorl. Last teleoconch whorl of 4 strong and 2 weak primary cords, topped with numerous, squamous threads. P1 spine broad, squamous, occasionally longest, P2 and P3 spines small, narrow, P4-P6 spines long with s4, s5 and s6. Presence of tertiary cords between s6 and ADP, and of numerous spiral threads over whole shell. Siphonal canal with ADP, t, ads, t, MP, t, ms (t), ABP, (t), abp and few threads. MP longest, ABP occasionally reduced (obsolete in holotype and in one paratype RH).

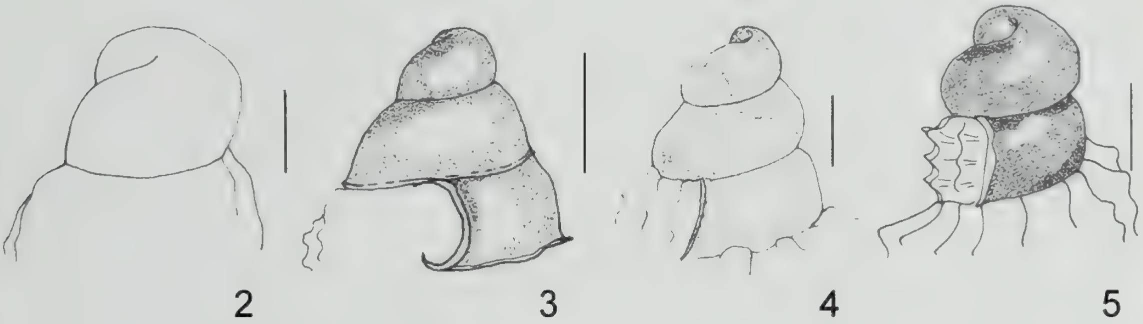
Aperture moderately large, ovate. Columellar lip narrow with small elongate folds, mostly all adapically, and strong parietal tooth at adapical extremity. Rim adherent. Anal notch deep, broad. Outer lip weakly erect, crenulated, with strong lirae within (ID split, D1-D4 split, D5). Siphonal canal moderately long, 32-37% of total shell length, narrow, strongly dorsally recurved at tip, narrowly open.

Operculum dark brown, ovate with apical nucleus.

Remarks. *Chicoreus jessicae* n. sp. resembles strongly *C. torrefactus* (Figs 13-17), however, it differs primarily in having a different larval development. *C. jessicae* has a broad, globular protoconch consisting of 1.5 whorl, with large first whorl (Figs 2, 12) denoting non-planktotrophic, or even intracapsular development, while *C. torrefactus* has a conical protoconch consisting of 3 glossy whorls, denoting planktotrophic larval development (Figs 3, 15-16). Other differences are minor but constant, *C. jessicae* is comparatively narrower (length/width ratio 1.8 or 1.9), compared to a length width/ratio of 1.7-1.9 in *C. torrefactus*. The spire is slightly lower, 37-43% of total shell length compared to 41-50 % in *C. torrefactus*. The aperture is narrower *vs.* its height (height/width ratio 1.3 or 1.4 with a majority of 1.4) compared to *C. torrefactus* (height/width ratio 1.2 - 1.4 with a majority of 1.2 and 1.3). Finally, the aperture in *C. jessicae* is smaller and narrower with a height of 24-27 % of the shell length, compared to 26-30 % in *C. torrefactus* (Tables 2 and 3). Other differences in the spiral cords and other shell morphology were not detected.

Chicoreus jessicae differs from *C. microphyllus* (Fig. 18) in having a different protoconch (Fig. 4), fewer intervarical ribs, a narrower shell and aperture, and a comparatively longer siphonal canal. It also differs from *C. akritos* (Fig. 19) in having a different protoconch and a comparatively longer siphonal canal. The protoconch of *C. akritos* is almost identical to that of *C. microphyllus*. It differs from the typical form of *C. banksii* (Fig. 20) in having a different protoconch (Fig. 5), a comparatively narrower and more biconical shell, and a lower spire.

Etymology. At the request of Jean-Pierre Barbier, this new species is named after his daughter, Jessica.



Figures 2-5. Protoconchs (scale bars: 0.5 cm)
2. *Chicoreus jessicae* n. sp.; 3. *C. torrefactus*; 4. *C. microphyllus*; 5. *C. banksii*.

ACKNOWLEDGEMENTS.

I am very grateful to Jean-Pierre Barbier (Philippines) who, once again, discovered a new Muricidae and sent it to me for further study. Thanks also for the gift of the holotype and paratypes. I thank also John Wolff (Lancaster, USA) who had a critical look to my English text.

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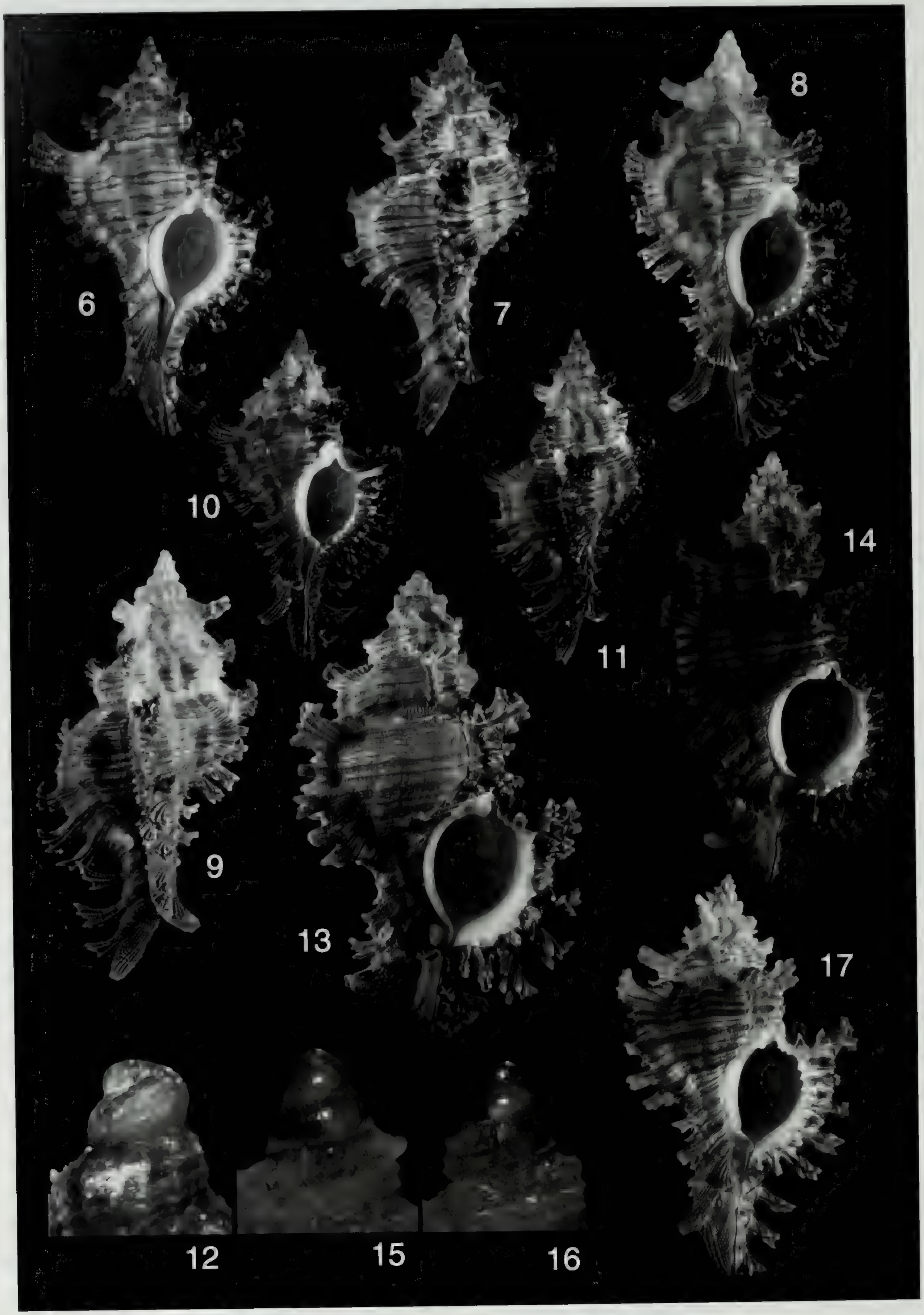
Figures 6-17

6-12. *Chicoreus jessicae* n. sp.
6-9. Philippine Islands, Palawan.
6-7. Holotype MNHN 21054, 69.6 mm; **8-9.** Paratype RH, 71.1; **10-11.** Paratype RH, 61.6 mm; **12.** Protoconch paratype RH 61.6 mm, scale bar 0.5 mm.);
13-17. *Chicoreus torrefactus* (Sowerby, 1841), Philippines, small islands between Cebu and Bohol.
13. 110 mm; **14.** 77.4 mm; **17.** 55.3 mm.
15-16. Protoconch (scale bars: 0.5 mm.).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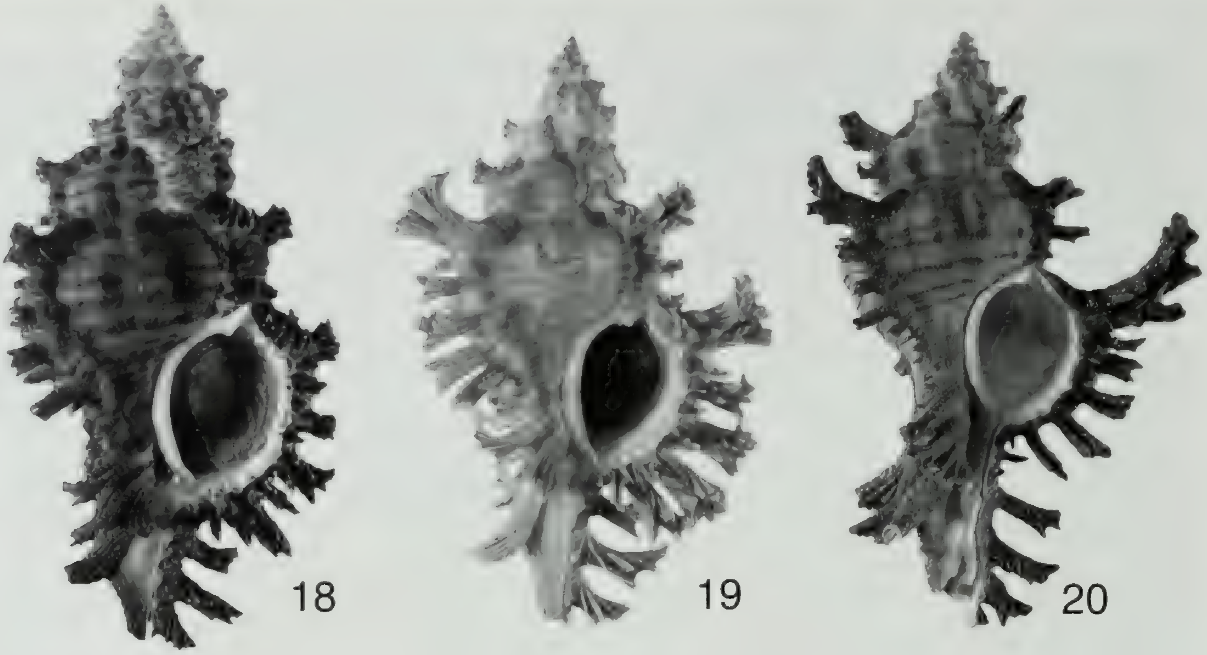
Locality	Height of the shell	Width of the shell	Length of the siphonal canal	Height of the spire	Height of the aperture	Width of the aperture
Philippines, South of Palawan, Balabac Island, holotype MNHN	69.6	38.3	26.0	29.0	17.8	12.9
South of Palawan, Balabac Island, paratype IRSNB	75.5	41.6	27.2	32.4	17.9	13.6
South of Palawan, Balabac Island, paratype RH	71.1	38.2	26.4	26.6	19.1	13.5
Palawan, paratype RH	61.6	33.9	22.1	25.1	14.9	10.9
South of Palawan, Balabac Island, paratype JPB	76.4	41.1	25.1	32.4	19.0	14.2
South of Palawan, Balabac Island, paratype JPB	71.8	37.1	26.6	29.4	17.6	13.8

Table 2. Shell measurement and locality data for *Chicoreus (Triplex) jessicae* n. sp. (in mm)

Locality	Height of the shell	Width of the shell	Length of the siphonal canal	Height of the spire	Height of the aperture	Width of the aperture
Philippines, islands between Cebu and Bohol	111	59.9	31.9	51.1	32.4	25.0
	82.2	42.1	25.8	35.4	24.6	18.1
	77.3	40.3	23.0	35.3	22.2	17.2
	72.1	40.0	23.7	32.1	19.7	14.7
	52.3	30.4	18.0	20.4	14.1	10.6
Philippines, Mactan	56.8	32.3	17.2	23.7	15.8	11.4
Papua New Guinea, Laing Island	85.1	49.1	25.3	38.5	22.4	18.7
	90.4	5.3.3	26.0	44.8	25.0	19.0
Japan,, Wakayama Prefecture	109.3	64.8	34.6	45.0	32.2	26.4
Thailand	82.0	49.0	26.7	34.3	24.2	19.4
Malaysia	83.0	48.8	23.3	37.9	24.2	19.6
Japan, Tosa	97.7	50.3	30.2	40.0	25.1	20.7
Papua New Guinea	78.4	44.1	24.4	35.4	20.6	17.1
New Caledonia	101.3	62.8	27.5	48.6	29.1	23.0
East Java	99.1	55.9	27.6	46.9	30.1	24.3
	94.3	55.4	25.4	42.2	27.3	21.8
West Thailand	105.1	60.1	28.1	53.0	26.5	22.8
Phuket, Thailand	84.7	45.4	24.5	38.1	24.2	19.0
	87.2	48.6	26.1	39.0	25.5	20.4
Seychelles	100.6	54.6	27.8	47.5	26.4	21.0

Table 3. Shell measurement and locality data for *Chicoreus (Triplex) torrefactus* (Sowerby, 1841) (in mm) (all coll. R. Houart).



Figures 18-20

18. *Chicoreus microphyllus* (Lamarck, 1816), Sulawesi, Indonesia, 84.3 mm; **19.** *C. akritos* Radwin & D'Attilio, 1976, Sulu, Philippines, 64.3 mm; **20.** *C. banksii* (Sowerby, 1841), Sabah Indonesia, 62.5 mm (all coll. RH).

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Powell, A.W.B. 1979. *New Zealand Mollusca. Marine, land and freshwater shells.* William Collins Publishers Ltd: xiv + 500 pp.

Mayr, E. 1989. Attaching names to objects. In: *What the philosophy of biology is : essays for David Hull* (M. Ruse, ed.), Klumer Academic, Dordrecht: 235-243.

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Papers describing new species (subspecies) will be accepted only if the primary types are deposited in a recognized public Museum or scientific Institution.

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Manuscripts. Manuscripts will be in English or in French. They must be typed on one column, ragged right (left-justified), double-spaced throughout, on one side only of A4. Margins must be at least 25 mm. The sequence of sections will respect the following order: title, name of author(s), address(es) of author(s), keywords and summary in English. Generic and (sub)specific names have to be typed in *italics*. References in the text should be given as follows: Keen & Campbell (1964) or (Keen & Campbell, 1964). **Refer to a recent issue of Novapex for the lay out.**

References, in alphabetic order, should be given in the following form (titles of journals should not be abbreviated):

Keen, A.M. & Campbell, G.B. 1964. Ten new species of Typhinae (Gastropoda : Muricidae). *TheVeliger* 7(l): 46-57.

Powell, A.W.B. 1979. *New Zealand Mollusca. Marine, land and freshwater shells.* William Collins Publishers Ltd: xiv + 500 pp.

Mayr, E. 1989. Attaching names to objects. In: *What the philosophy of biology is : essays for David Hull* (M. Ruse, ed.), Klumer Academic, Dordrecht: 235-243.

Internet resources.

Author(s) 2007. Title of the website or database, publisher name and locatiuon (if indicated), number of pages, address: http://www.... (date of access).

Illustrations. Photographs must be of a high quality (colour or black/white), printed on glossy paper in a final version (max. 16 X 21 cm), adequatly mounted. Colour work can be submitted for black & white production. The illustrations may be submitted as digital files (CD-ROM, ZIP) in BMP, JPG or TIFF format, with mention of the program. They must be adequately mounted with not any other text than the numbering. A printed version of the plates must be imperatively sent together with the manuscript.

If more than one figure is included in a plate or/and in the text, ALL figures must be consecutively numbered (Fig. 1, 2, 3...) NOT Fig 1A, 1B, 1C, NOR plate 1, Fig. 1...

Inclusion of colour plates has to be approved by the board who will take the final decision. Authors who want to include colour plates are invited to ask for possibilities and charges.

Processing of manuscripts. Manuscripts will be submitted to the board who will distinguish between the articles of scientific interest, and those of general aim. The comments will be communicated to authors, who will consider them. A diskette containing the corrected version should be sent back to the Belgian Malacological Society (in Word for Windows support) together with a printed copy. It should strictly follow the style instructions which will be communicated to the author(s).

Reprints. With regard to papers of scientific interest, 30 reprints are free of charge, representing a maximum of 240 pages, if at least one author is member of the Society. Additional copies (at least 30) will be invoiced at cost.

For non-members, the reprints (min. order 30 copies) will be billed to the author(s). Mailing costs are always to be paid by authors.

Manuscripts, corrected proofs and any mail are to be sent to:
Société Belge de Malacologie, Mr. R. Houart, B.P. 3, B-1370 Jodoigne, Belgium.

Vie de la Société – Life of the Society

(suite)

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COTISATIONS – LIDGELD – DUES

2009

La fin de l'année est proche et le dernier numéro de NOVAPEX de 2008 est entre vos mains. Le premier numéro de 2009 sera daté du 10 mars. Pensez à renouveler votre cotisation dès maintenant (40 euros pour les membres résidant en Belgique, 55 euros pour les membres étrangers).

Het einde van 2008 is nabij en dit is het laatste nummer van NOVAPEX voor dit jaar. Het eerste nummer van 2009 zal op 10 maart verschijnen. Denk eraan uw lidgeld nu te regelen (40 euros voor de Belgische leden, 55 euros voor buitelandse leden). Hartelijk dank voor uw getrouwheid.

The end of the year is close and this is the last issue of NOVAPEX for 2008. The first issue of 2009 will be dated 10 March. Please don't forget to pay your membership fees now. (55 euros for foreign subscribers) Thanks for your faithfulness.

Membres résidant en Belgique

(avec NOVAPEX, NOVAPEX/SOCIETE et les numéros hors série à tirage irrégulier)

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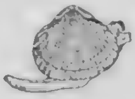
A NOS AMIS FRANÇAIS

Vous êtes nombreux à nous envoyer un chèque bancaire ou un chèque de La Poste pour régler votre cotisation ou pour tout autre paiement. Malheureusement, nous vous rappelons que les chèques de La Poste ne sont pas endossables en **Belgique**. Nous en sommes désolés ! Le virement postal est donc le seul moyen utilisable depuis la France.
Il vous reste également la possibilité de virer les 55 euros au compte 14505 00001 04145370778 au nom de Mr M. ALEXANDRE, Rue de la libération, 45, 6182 Souvret.

VIE DE LA SOCIETE LIFE OF THE SOCIETY



Prochaines activités de la SBM

Claude VILVENS

Lieu de réunion : Médiathèque de l'Institut St Joseph - Rue Félix Hap 14 - 1040 Bruxelles
à partir de 14h. *Sonnez et l'on vous ouvrira !*

ATTENTION ! *Nos activités peuvent nous emmener dans diverses salles (particulièrement pour des projections ou des montages audio-visuels). Il ne nous est donc plus possible d'ouvrir les portes à distance après 15H.*

SAMEDI 13 DECEMBRE 2008

Tout le monde : Quizz "Questions pour un malacologue"

Organisation : Etienne Meuleman, Roland Houart et Claude Vilvens

Pour terminer l'année 208, nous serons donc ludiques ! Chacun pourra exercer ses connaissances en répondant, au sein d'une équipe, à une batterie de questions en tous genres, mais traitant bien sur de malacologie. "Fallait appuyer ?" ;-)

***

SAMEDI 10 JANVIER 2009

Tout le monde : L'EXPOSITION ANNUELLE DE LA SBM.

Le rendez-vous rituel de l'exposition de coquillages par les membres de la Société est l'occasion pour chacun de montrer l'un ou l'autre aspect de la malacologie qui lui tient à cœur. Aucune condition particulière n'est requise et tout le monde est cordialement invité à participer et aussi, bien sûr, à venir admirer quelques spécimens qui font la fierté de la collection de nos membres !

***

SAMEDI 7 FEVRIER 2009

Tout le monde : ASSEMBLÉE GÉNÉRALE DE LA SBM.

-- Voir annonce officielle page suivante --

Le bilan, les projets, les souhaits, les critiques (pas trop quand même) ... Tout le monde a la parole !
Nous vous attendons donc nombreux … d'autant que cette Assemblée générale se termine toujours par le verre de l'amitié ☺ … En effet, si il convient de rappeler l'importance de cette Assemblée, il faut aussi en souligner le côté amical et détendu.

***

SAMEDI 21 MARS 2009

Nathal Severijns: Les Solenidae et les Pharinae européens

Le Président de la société belge néerlandophone de malacologie (la BVC) en personne va nous entretenir des "Couteaux" qu'il connaît si bien et dont la taxonomie lui est bien connue, comme le prouvent d'ailleurs ses publications sur le sujet. Une très belle occasion de (re)découvrir ces bivalves aux formes élancées.

***

Réservez déjà dans vos agendas les 25/4 et 13/6 2009.

Pour les informations de dernière minute :

http://users.swing.be/sw216502/ ou http://www.sbm.be.tf

L'Assemblée Générale de la Société Belge de Malacologie

Conformément aux statuts de la Société Belge de Malacologie A.S.B.L.,une **Assemblée Générale** de l'Association se tiendra le samedi **7 février 2009** à **14h** en son local de le Rue Félix Hap, 14 à 1040 Bruxelles.

Ordre du jour

- Rapport moral
- Comptes de l'exercice 2008
- Prévisions budgétaires pour l'exercice 2009
- Election ou réélection d'administrateurs (les candidatures, démissions ou demandes de réélection doivent parvenir au Président actuel pour le 31 janvier 2009 au plus tard).
- Publications de la Société
- Cotisations 2010
- Divers

Nos membres sont instamment priés d'assister à cette Assemblée Générale

Nous rappelons que, conformément à l'article 6 des statuts, tout membre peut se faire représenter par un autre membre, moyennant procuration écrite. Un seul mandataire ne peut cependant recevoir que trois mandats de l'espèce.

Pour le conseil d'administration,

A. LANGLEIT
Secrétaire

R. HOUART
Président

Novapex/Société : la publication généraliste de la SBM

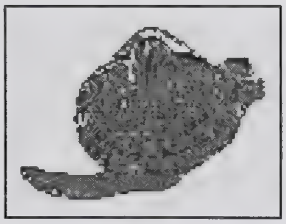
Rédacteurs en chef : Claude Vilvens et Etienne Meuleman

Tous les articles généraux sont les bienvenus pour Novapex/Société ☺ !

Afin de faciliter le travail de la Rédaction, il est vivement (et le mot est faible ;-)) souhaité de respecter les règles suivantes pour les articles proposés :

- document MS-Word (pour PC Windows 2000 ou XP);
- police de caractères Times New Roman;
- texte de taille 10, titres de taille 12;
- interligne simple;
- toutes les marges à 2,5 cm;
- document en une seule section;
- pas de mode colonne;
- photos en version électronique JPG.

Merci pour les Scribes ;-) ! N'hésitez pas à demander une page avec en-tête pour cadrer au mieux vos travaux (vilvens.claude@skynet.be).



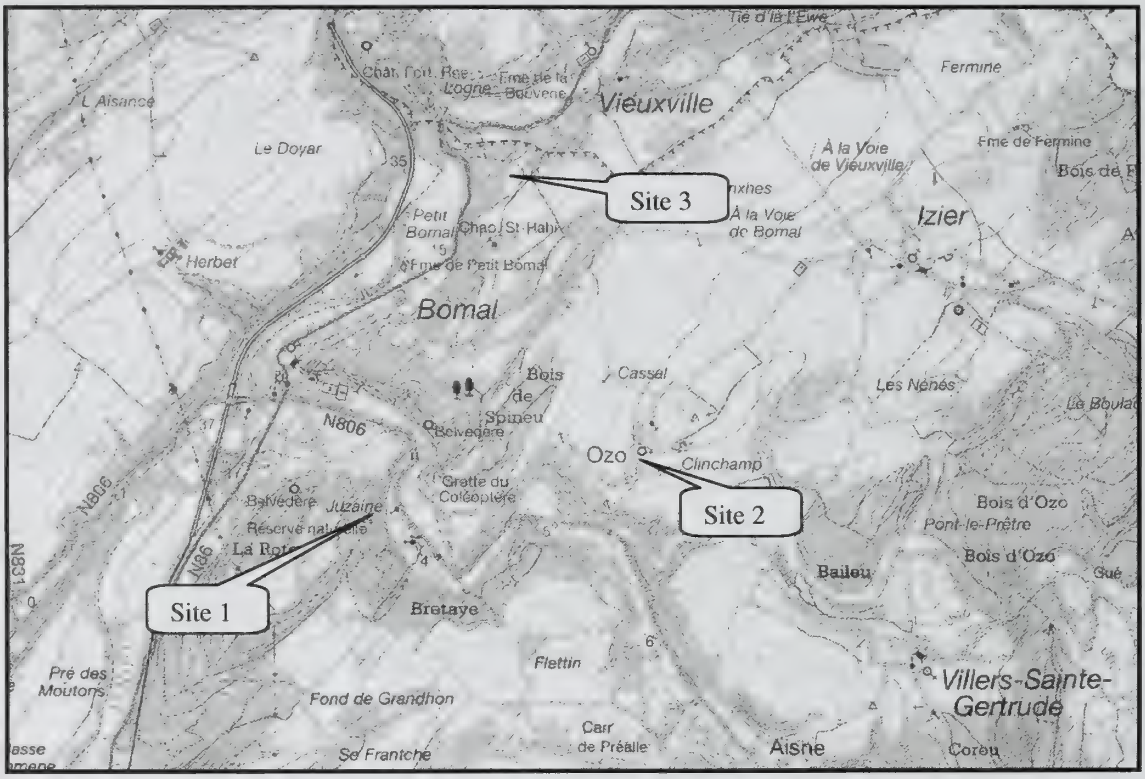
Excursion du samedi 31 mai 2008 dans la région de Bomal-sur-Ourthe (commune de DURBUY)

Bruno MAREE - Etienne MEULEMAN

Cinq courageux malacologues et amis de la nature se sont réunis ce samedi 31 mai pour une prospection malacologique dans la région de Bomal-sur-Ourthe.

Au cours de cette journée, nous avons visité trois sites :

- Site 1 : JUZAINE – en bordure de l'Aisne, plaine alluviale – végétation rivulaire à podagraire, herbe aux goutteux (*Aegopodium podagraria*), Consoude officinale (*Symphytum officinale*), Julienne des dames (*Hesperis matronalis*), Reine des Prés (*Filipendula ulmaria*), …
- Site 2 : Hameau d'OZO – Lisière forestière et bord de prairie pâturée + dépôts de remblais calcaires – végétation herbacée dense avec *Geranium pyrenaicum, Scrophularia nodosa, dipsacus fullonum*, le cabaret des oiseaux…
- Site 3 : Entre BOMAL et VIEUXVILLE – Massif forestier et petit vallon humide en bordure de route – végétation typique des forêts calcaires avec érable champêtre (*Acer campestris*), mercuriale (*Mercurialis perennis*), fougère langue de cerf (*Asplenium scolopendrium*), … Signalons aussi, en lisière du bosquet l'observation d'un splendide coléoptère de la famille des cérambycidés (longicornes) : *Agapanthia villosoviridescens*.


Site 3
Site 2
Site 1
Vieuxville
Bomal
Izier
Ozo
Juzaine
Bretaye
Villers-Sainte-Gertrude
Aisne
Le Doyar
Herbet
Fermine
Cassal
Clinchamp
Les Nénés
Bois de Spineu
Grotte du Coléoptère
Bois d'Ozo
Baileu
Flettin
Fond de Grandhon
N806
N831

Les déterminations sont basées sur les récoltes de Bruno Marée et Etienne Meuleman.

Résultats des différentes récoltes

Liste des espèces (ordre alphabétique)	Site 1	Site 2	Site 3
Ancylus fluviatilis O.F. Müller, 1774	X	X	X
Arion (Arion) rufus (Linné, 1758)	X	X	X
Arion (C.) silvaticus Lohmander, 1937	X		X
Arion (Kobeltia) hortensis A. Frussac, 1819	X	X	X
Arion (Mesarion) subfuscus (Draparnaud, 1805)	X	X	X
Boettgerilla pallens Simroth, 1912			X
Carychium (Saraphia) tridentatum (Risso, 1826)		X	X
Cepaea (Cepaea) hortensis (O.F. Müller, 1774)	X		X
Clausilia (C.) bidentata (Ström, 1765)	X		X
Clausilia (C.) rugosa parvula (A. Férussac, 1807)	X		X
Cochlodina (Cochlodina) laminata (Montagu, 1803)	X	X	X
Deroceras (D.) reticulatum (O.F. Müller, 1774)	X	X	
Discus (G.) rotundatus (O.F. Müller, 1774)	X	X	X
Fruticicola fruticum (O.F. Müller, 1774)	X		
Helicigona lapicida (Linnaeus, 1758)			X
Helicodonta obvoluta (O.F. Müller, 1774)			X
Helix (Helix) pomatia Linnaeus, 1758	X	X	X
Lehmannia marginata (O.F. Müller, 1774)	X		
Limax cinereoniger Wolf, 1803		X	X
Macrogastra (Pseudovestia) rolphii (Turton, 1826)			X
Merdigera obscura (O.F. Müller, 1774)			X
Monachoides incarnatus (O.F. Müller, 1774)	X		X
Oxychilus (Oxychilus) cellarius (O.F. Müller, 1774)	X	X	X
Sphyradium doliolum (Bruguière, 1792)		X	X
Succinea putris (Linnaeus, 1758)	X	X	
Tandonia rustica (Millet, 1843)	X		X
Vitrina pellucida (O.F. Müller, 1774)	X		
Total (nombre d'espèces)	**19**	**13**	**22**

Soit 27 espèces dont 9 limaces (qui constituaient le but principal de la prospection de ce jour !) et un unique dulcicole dans les eaux de l'Aisne, mais la prospection du cours d'eau fut assez sommaire. Pas de découverte exceptionnelle, mais une « évidente mise en évidence » de la répartition caractéristique des espèces en fonction des conditions écologiques des trois milieux prospectés.

Excellente et agréable journée de travail !

Limax cinereoniger Wolf, 1803

Helix (Helix) pomatia Linnaeus, 1758

Ouvrages consultés

- Adam, W., 1960. *Faune de Belgique – Mollusques (Tome I).* Institut Royal des Sciences Naturelles de Belgique, Bruxelles.
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- Kerney M.P. & Cameron R.A.D., 1999. *Guide des escargots et limaces d'Europe.* Delachaux et Niestlé, Lausanne.
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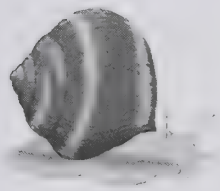
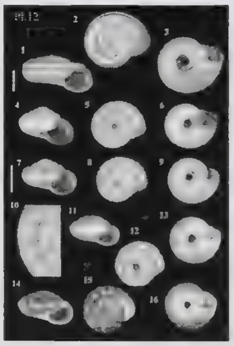




Rappel : Une initiative de la SBM - des fascicules sur les mollusques terrestres de Belgique pour un grand public naturaliste

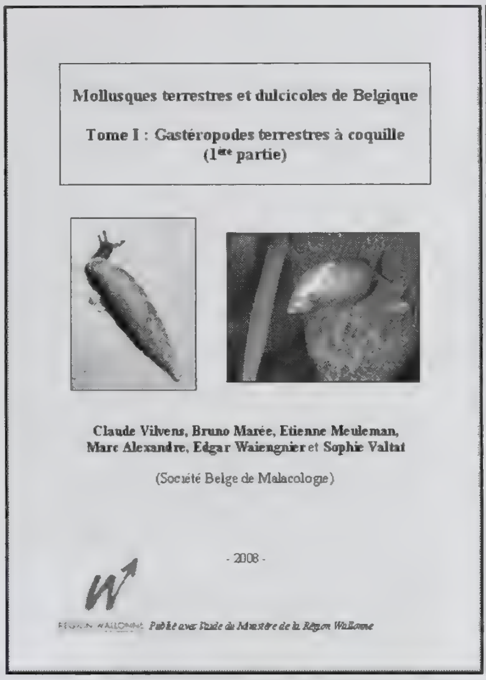
Claude VILVENS

La Société Belge de Malacologie publie :

Mollusques terrestres et dulcicoles de Belgique

Tome I : Gastéropodes terrestres à coquille (1$^{\text{ère}}$ partie)
Tome II : Gastéropodes terrestres à coquille (2$^{\text{ème}}$ partie)

par **Claude Vilvens, Bruno Marée, Etienne Meuleman, Marc Alexandre, Edgar Waiengnier** et **Sophie Valtat**



Mollusques terrestres et dulcicoles de Belgique

Tome I : Gastéropodes terrestres à coquille (1$^{\text{ère}}$ partie)

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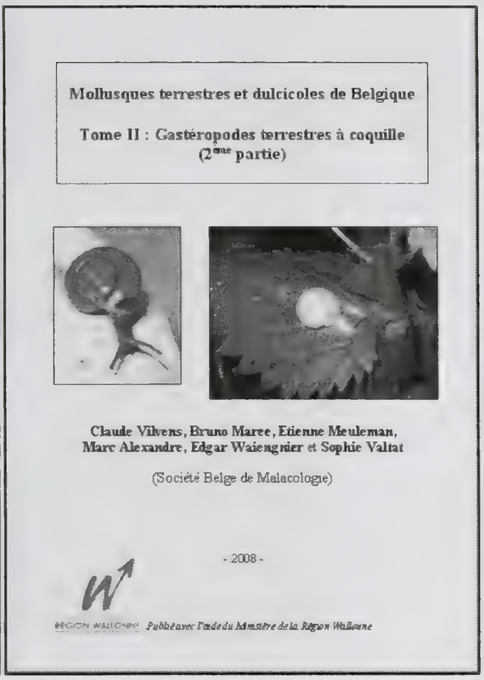
(Société Belge de Malacologie)

- 2008 -

RÉGION WALLONNE Publié avec l'aide du Ministère de la Région Wallonne



Mollusques terrestres et dulcicoles de Belgique

Tome II : Gastéropodes terrestres à coquille (2$^{\text{ème}}$ partie)

Claude Vilvens, Bruno Maree, Etienne Meuleman, Marc Alexandre, Edgar Waiengnier et Sophie Valtat

(Société Belge de Malacologie)

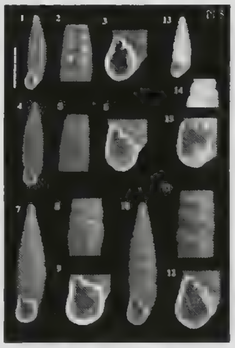
- 2008 -

RÉGION WALLONNE Publié avec l'aide du Ministère de la Région Wallonne

pp. 1-60 & 1-52, 24 planches couleurs et nombreux dessins
Format A5 (14 x 21 cm), couverture souple.
Publiés par la Société Belge de Malacologie
Prix: **12.00** EUR pour les deux tomes + **frais de port** (**1.62** EUR par couple des deux tomes en Belgique, 4.80 EUR en Europe, 5.40 EUR hors Europe)

Commandes et paiements : Par virement sur le compte : **271-0065013-55**
de Mr **Etienne Meuleman**, Bibliothécaire de la SBM
Sart 32 - 4171 Poulseur
avec en communication : Terrestres : nom client + quantité de couples Tomes I&II
Si l'adresse de livraison diffère de celle de paiement, le préciser par e-mail à :
etienne.meuleman@softplayeurope.com

L'objectif est de fournir un outil de détermination des mollusques que l'on peut être amené à rencontrer lors de ses balades naturalistes. Les auteurs ont donc choisi de réaliser un guide écrit en français, dans un langage accessible à un non spécialiste (donc sans termes trop techniques), avec un bon niveau taxonomique mais sans exagération pour les niveaux supérieurs, et illustré de photographies en couleurs (toujours de la coquille avec parfois des gros plans et aussi l'animal in situ), rendant ainsi l'ensemble utilisable sur le terrain. Pour chaque espèce rencontrée, la description est proposée selon un canevas immuable, avec, si nécessaire, des comparaisons avec les espèces similaires.



L'écho des réunions

Marc ALEXANDRE & Claude VILVENS

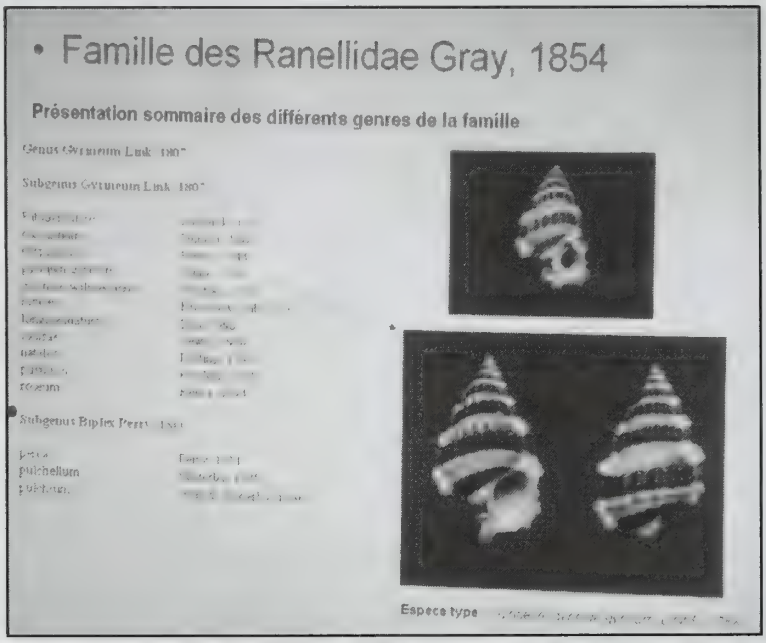
Réunion du 21 juin 2008 (CV) ➔ **Etienne Meuleman : Les Ranellidae.**

Notre bibliothécaire nous a donc entretenu des Ranellidae Gray, 1854, coquilles richement décorées dont l'une des espèces les plus connues est bien sûr *Charonia tritonis tritonis* (Linné, 1767)

Cette famille comporte une dizaine de genres (dont les Ranellinae avec *Argobuccinum, Fusitriton, Gyrineum, Ranella* et les Cymatinnae avec *Cabestana, Charonia, Cymatium* (beaucoup d'espèces), *Linatella, Sassia*) et environ 140 espèces. A remarquer que, à partir de fossiles (le Pliocène a été l'époque du grand rayonnement des Ranellidae), Beu a établi que les *Distortio* ne font plus partie des Ranellidae

Etienne nous a produit dans un montage bien structuré des photos d'espèces vivantes, un petit tour du monde des espèces de Ranellidae et aussi leur place dans l'histoire des Hommes : art et instruments de musique (avec apex tronqué) - et bien sûr des spécimens de sa collection ☺

Un bien agréable voyage dans cette spectaculaire famille !



• Famille des Ranellidae Gray, 1854

Présentation sommaire des différents genres de la famille

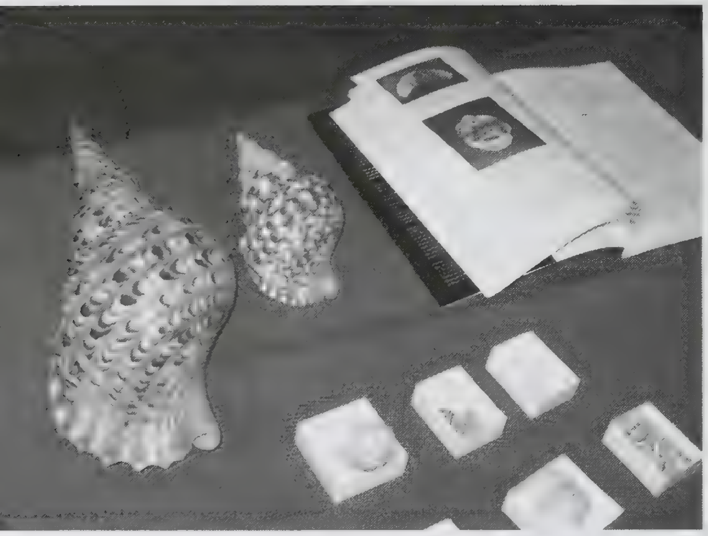
Genus Gyrineum Link 1807

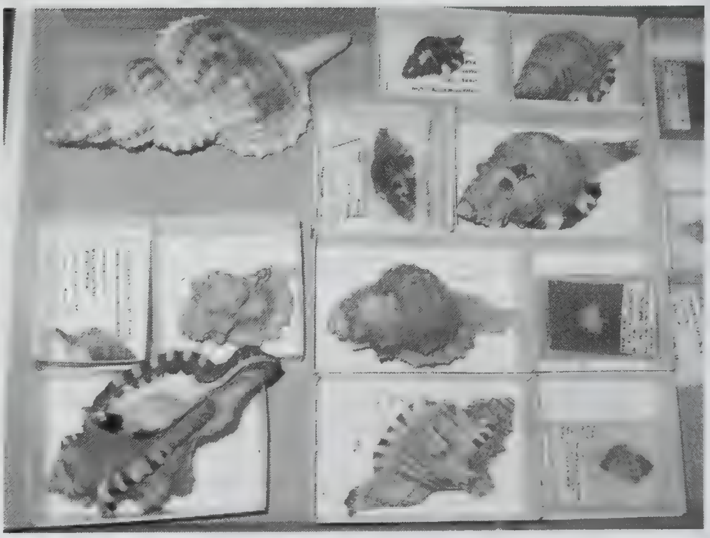
Subgenus Gyrineum Link 1807

Subgenus Biplex Perry 1811

pulchellum

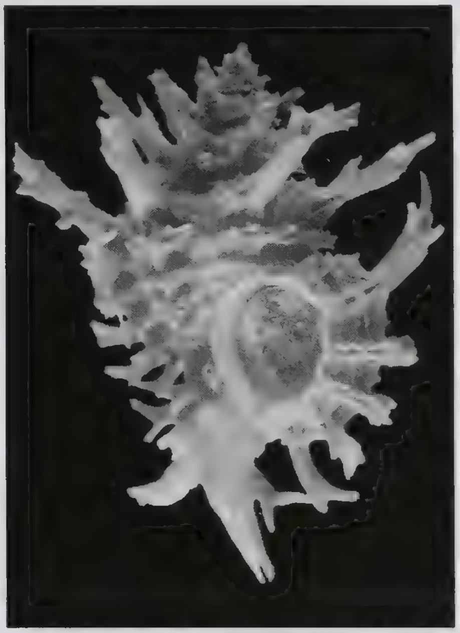
Espece type



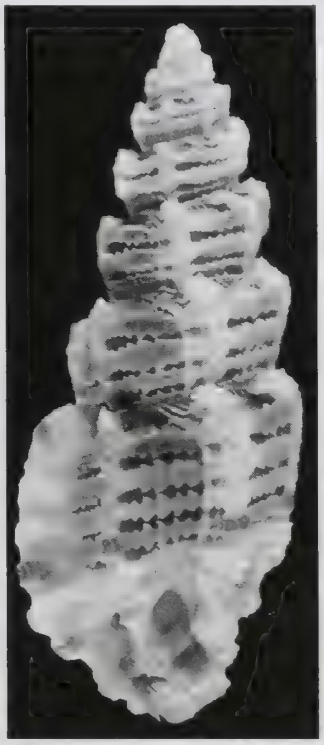


Réunion du 3 mai 2008 (MA) ➔ **Roland Houart : Les Muricopsinae (suite) : les genres *Acanthotrophon*, *Bizetiella* et *Farvatia***

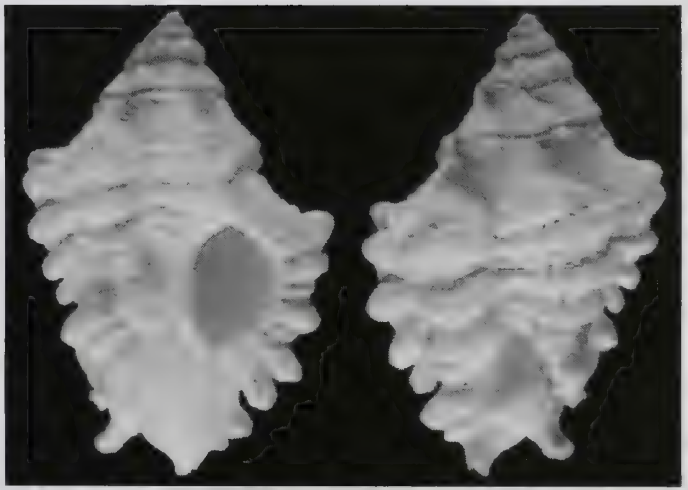
C'est avec brio qu'une fois de plus notre ami Roland Houart, nous a présenté ces merveilleuses coquilles que sont les Muricidae.
Seconde partie de sa présentation sur les Muricopsinae, cette conférence regroupait les genres *Acanthotrophon*, *Bizetiella*, *Farvatia* et le sous-genre *Farvatia* qui à eux seuls comptent 66 espèces : 4 chez *Acanthotrophon*, 3 chez *Bizetiella* et 59 chez *Farvatia*.
Comme à son habitude Roland Houart avait réalisé une magnifique présentation en Power Point qui nous permettait d'admirer ces superbes coquilles grâce à des photos de qualité accompagnée d'une carte qui nous permettait de situer bien vite le lieu d'où elles venaient et ainsi peut-être également nous faire rêver à des vacances prochaines.
Loin d'être terminée la saga des Muricidae nous reviendra bientôt avec j'en suis sûr, encore de nombreuses merveilles à admirer.



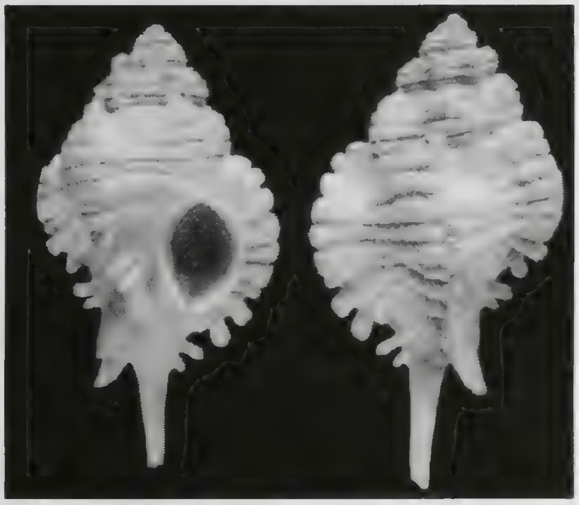
Favartia pelepili



Favartia erosa



Favartia burnayi

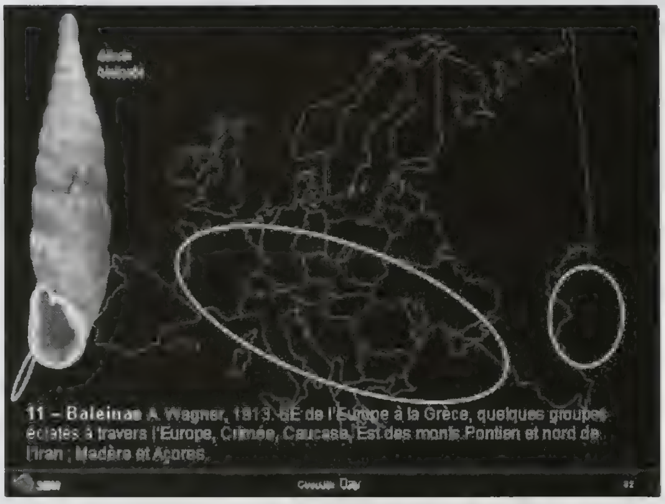


Favartia emersoni

Réunion du 6 septembre 2008 (CV) ➔ **L'Atelier Clausiliidae-Day.**

L'idée était de rassembler le plus possible de Clausiliidae et aussi de rassembler le maximum d'informations à leur sujet. Un très clair montage Powerpoint réalisé par Edgar Waiengnier introduisait le sujet. Vinrent ensuite toutes une série de questions et d'échanges de points de vue, avec les Clausiliidae en 10 questions :

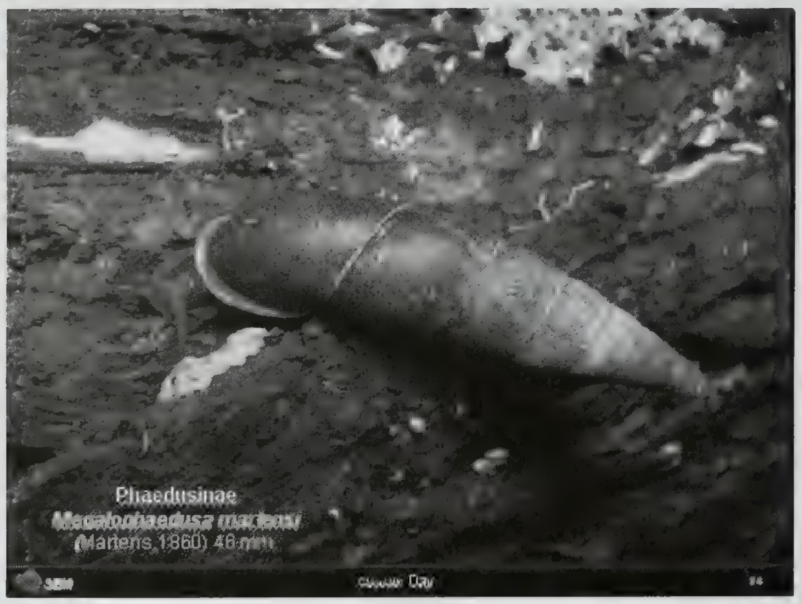
- On est un Clausiliidae si on a un clausilium ? Mais c'est quoi, un clausilium ?
- Combien y a-t-il à peu près d'espèces ?
- Les sous-familles sont basées sur quels critères ?
- On peut trouver des Clausiliidae partout dans le monde ? Et en Belgique ?
- Les Clausiliidae ont-ils des biotopes de préférence, voire même absolument nécessaires ?
- Certains malacologues sont-ils des autorités reconnues pour cette famille ?
- Y a-t-il des sites Web consacrés exclusivement aux Clausiliidae ?
- Comment nettoie-t-on un Clausiliidae que l'on a récolté ?
- Y a-t-il des familles assez proches taxonomiquement ?
- Le Clausiliidae type est-il assez petit (<=20 mm), à spire très élevée et élancée, avec au moins une dizaine de tours, un apex arrondi, une ouverture senestre et avec un certain nombre de lamelles et plis ? Existe-t-il des exceptions ?



11 – Baleinae A. Wagner, 1913. SE de l'Europe à la Grèce, quelques groupes éclatés à travers l'Europe, Crimée, Caucase, Est des monts Pontien et nord de l'Iran ; Madère et Açores.

Et, enfin, la contemplation de magnifiques spécimens provenant de diverses collections appartenant aux membres présents.

L'objectif final, à savoir la confection d'un poster dédié aux "pointus", est en voie de réalisation – à suivre ;-



Phaedusinae
Megalophaedusa martensi
(Martens, 1860) 48 mm

Résultat du sondage effectué auprès de nos membres

Annie Langleit, Sophie Valtat, Marc Alexandre,
Roland Houart et Etienne Meuleman
(responsables du sondage).

Souvenez-vous, afin de connaître vos desiderata, vos remarques et autres suggestions, en 2006 nous vous avions envoyé un petit questionnaire sous forme de sondage. Voici ce que cela a donné comme réponses. Nous avons cru bon d'ajouter quelques commentaires (en italiques) et nous l'avons fait dans la langue du correspondant.
Un grand merci pour votre participation.

Nous avons reçu 24% de réponses

Revues:

- À la question lisez-vous Novapex, 89% ont répondu oui, 8,2% non, 2,8% des membres ne se prononcent pas.
- À la question lisez-vous Novapex société, 97,2% ont répondu oui, 2,8% non.

Suggestions pour l'amélioration des revues :

- Publier la liste des événements dans le monde : Bourses – Symposiums etc. ***Nous essayons, dans la mesure du possible de vous tenir au courant, si bien sûr les organisateurs nous signalent ces événements en temps voulu..***
- Signaler les membres qui vendent ou échangent des coquilles. ***Une rubrique vous est ouverte à chaque demande.***
- Placer des photocopies couleurs dans Novapex Société. ***Cela est prévu..***
- Avoir un plus grand nombre de planches ou photos couleurs. ***Cela implique également un budget très important et une réponse positive à nos demandes de subsides. Nous y travaillons !***
- Avoir plus d'articles sur les terrestres. ***Ben oui, mais nous attendons les articles.***
- Rendre Novapex accessible aux articles d'éthologie et d'écologie. ***Dans la mesure du possible cela a déjà été fait.***
- Trouver plus d'argent pour encore en améliorer la qualité des revues. ***trouver plus d'argent n'est pas chose facile et il est évident que toutes les suggestions pour en trouver sont les bienvenues (voir également plus haut).***
- Augmenter le nombre d'articles de 50%. ***Nous aimerions également avoir plus d'articles mais pour cela il nous faut des auteurs ! Les propositions sont les bienvenues. Mais nous pensons sincèrement que le volume de ce que nous publions est égal, si pas supérieur à ce qui est fait ailleurs.***
- Plus d'articles dans Novapex/Société voir un gros résumé en français des articles de Novapex. ***Même remarque que pour Novapex: il nous faut des auteurs, sans auteurs nous ne pouvons rien faire. Vous êtes tous les bienvenus pour un compte rendu de collecte pendant vos vacances par exemple. Vous avez observé une espèce invasive en Méditerranée, découvert des espèces que l'on croyait très rare dans une région de la Belgique, venez nous le raconter dans Novapex/Société.***
  Quel serait l'intérêt de voir un résumé dans Novapex/Société de ce qui se trouve dans NOVAPEX. Nous ne comprenons pas très bien la question.
- It would be good to see shell cartoons. ***They are welcome !***
- More pages in marine European molluscs. ***They are also welcome. Therefore we need authors, but we think that you already got some satisfaction.***
- Novapex/Société: Write all articles in English please. ***That's a good question… but difficult to do. In fact each (or many) societies have a contact paper (Japan, China, Spain, Italy, etc.). Each time the contact paper is written in the native language of the country. So, as we are the French spoken Society from Belgium our contact paper is in French… Sorry.***
- Very little to improve unless you wish to add articles by collectors their various w/w collecting trips.
- Novapex: it's fine the way it is! Novapex/Société: only use full for people who can read French, translate important articles in to English. ***See our answer above, but of course important papers may be translated by the author(s).***

Réunions:

À la question assistez-vous aux réunions, 30,5% ont répondu oui,
69,5% non.

Les raisons invoquées sont les suivantes: ne vit pas en Belgique; habite trop loin; n'est pas collectionneur; manque de temps; à d'autres obligations; se trouve souvent à l'étranger; ou quelques autres bonnes raisons.

À la question êtes vous intéressés par les conférences, 33,1 % ont répondu oui, 36,1 % non, 30,8% ne se prononcent pas.

Les raisons invoquées sont les suivantes: ne vit pas en Belgique; les sujets ne rencontrent pas notre centre d'intérêt; ne concerne pas l'Europe; trop souvent axées sur les espèces
marines; conférences uniquement données en français; ne peux y assister (distance) et sujets souvent trop anecdotiques, on pourrait mettre plus de contenu même quand il s'agit d'un compte rendu de récolte.
Il va sans dire que nous tiendrons compte de ces remarques. Une seule pose problème, c'est la langue utilisée. Nous sommes une société francophone et comme toute société nous fonctionnons dans notre langue. Néanmoins, un grand nombre de participants, et même d'orateurs, font le premier pas et puis… reviennent régulièrement. Essayez !

À la question souhaiteriez-vous un jour présenter une conférence, 27,7% ont répondu oui, 49,9% non, 22,4 des membres ne se prononcent pas.

Sujets de présentation proposés

- Espèces marines de la mer de Norvège et de l'Arctique.
- Les chitons.
- Mollusques du Golfe du Lion.
- Mollusques de Djerba.
- Voyage.
- Muricidae.
- Haliotidae et mollusques en général.
- Journées d'études communes avec AFC ou MNHN.
- Diversité de la faune malacologique de l'Afrique de l'ouest.
- Western Iberian gastropod palaeobiogeography.

Ben que voilà de bonnes nouvelles ! Nous attendons impatiemment de vous rencontrer pour en discuter. Un grand merci d'avance.

Excursions:

À la question participez-vous aux excursions, 13,8% ont répondu oui,
72,2% non, 14% des membres ne se prononcent pas.

Les raisons invoquées sont les suivantes, Ne vit pas en Belgique; ***Le fait de vivre aux Etats-Unis ou dans les DOM TOM pose évidemment un problème, mais nombre de nos membres du Nord de la France nous on déjà rejoints lors de nos excursions***; motif de santé; manque de temps; pas mon centre d'intérêt; pas d'espèces marines; ***pour l'instant non, mais cela pourrait venir bien sûr;*** travail le week end; trop loin : ***voir plus haut.***.

Suggestions ou idées pour les excursions

- Louer un bateau avec une drague et aller sur des sites en mer du nord. ***Euh… excellente initiative, mais qui organise tout cela ?***
- Organiser des excursions de longue durée, par exemple 1 semaine en Bretagne ou dans les Dolomites. 1fois par an. *Cela s'est déjà fait dans le temps.* ***Beaucoup d'intérêt au départ… peu de participants aux inscriptions… et quelques absences aux départs…Néanmoins si quelqu'un se propose d'organiser ce genre d'excursion, cette personne peut toujours nous contacter.***

Internet: À la question connaissez-vous notre site Internet, 72,2% ont répondu oui, 27,8% non. ***Nous espérons que cette lacune est comblée depuis lors. Pour rappel: http://users.swing.be/sw216502/***

À la question: le consultez-vous régulièrement, 47,2% ont répondu oui, 2,8% oui, mais occasionnellement, 41,6% non, 8,4% des membres ne se prononcent pas.

Les rubriques consultées sont les suivantes : en première position "Les actualités", en seconde position "Les malacologues célèbres" et enfin en dernière position "Le lexique".

Suggestions pour l'amélioration du site

- Relooking pour donner une impression de nouveauté, intro avec vidéo et musique, le rendre plus actuel plus animé.
- Traduction du site en anglais tout au moins certains sujets (Réunions, excursions, publications).

Ces remarques seront transmises à la personne responsable. Un "relooking" a déjà vu le jour récemment.

Activités SBM

À la question pouvez-vous classer ces activités de la SBM par ordre d'intérêt, voici le classement réalisé par les membres qui ont répondu au sondage.

1- Novapex
2- Novapex/Société
3- Site Internet
4- Contact
5- Bibliothèque
6- Echanges et Excursions
7- Réunions
8- Conférences

Liste de membres

À la question "souhaiteriez-vous figurer sur une liste des membres de la SBM ?", 80,5% ont répondu par l'affirmative, 11,1% par la négative et 8,4% des membres ne se sont pas prononcé.

Raisons invoquées pour ne pas se trouver dans cette liste: trop de questions à répondre et demande d'échanges alors que pas d'intérêt pour les échanges, intéressé uniquement par l'abonnement à Novapex, pas d'adresse e-mail sur Internet pour éviter les spams, privé.

À la question "préféreriez-vous cette liste sur Internet, dans la revue ou sur les deux supports ?", 5,5% préfèreraient figurer sur Internet, 16,5% préfèreraient figurer dans la revue, 47,2% préfèreraient figurer sur les deux supports, 30,8% des membres ne se prononcent pas.

La publication d'une telle liste ne sera donc pas à l'ordre du jour. Surtout qu'il s'agit ici d'un échantillon tiré de 24 % de nos membres.

Connaissance des membres

80,6% des membres ayant répondu à ce sondage sont des hommes, 16,6% sont des femmes, 2,8% des membres ne se sont pas prononcé.

8,3% des membres ont entre 20 et 39 ans, 61% ont entre 40 et 59 ans, 30,7% ont 60 ou plus.

Vos centres d'intérêt en malacologie I

1- Gastéropodes
2- Collection
3- Systématique
4- Bivalves
5- Ecologie – Scaphopodes – Polyplacophores
6- Céphalopodes

Vos centres d'intérêt en malacologie II

1- Espèces marines
2- Coquilles
3- Espèces actuelles
4- Mollusques terrestres

5- Ecologie
6- Espèces d'eau saumâtre – Espèces fossiles – Anatomie
7- Ethologie

Famille(s) ou genre(s) particulier(s) :

- Tellinoidea-Tellinidae
- Helicoidea
- Cypraeidae
- Conidae
- Strombes et eaux douces
- Terrestres
- Patellidae
- Toutes familles
- Muricidae - Cypraeidae
- Spondyles
- Fissurelloidea-Patelloidea-Stromboidea-Cypraeoidea-Cardioidea-Glossoidea
- Mitridae – Costellariidae - Olividae (Genre *Oliva* uniquement)
- Strombidae-Fasciolariidae-Buccinidae-Cardiidae
- Tout terrestres et fresh water – Bivalves marins – Gastéropodes marins
- Ovulidae – Turridae – Mitridae – Costellariidae
- Toutes familles, prèférence pour Epitonidae – Pectenidae – Conidae – Cypraeidae genre Lyria.
- Espèces marines de l'Atlantique est (Islande à Namibie) Inclusif la Méditerranée
- Muricidae
- Haliotidae – Muricidae – Cypraeidae
- Nassariidae – Neritidae – Cerithiidae
- Marginella – Cypraea – Voluta – Conus – Murex – Latiaxis – Mitra – Epitonium – Latirus – Ovulidae – Cancellaria – Pectens
- Naticidae
- Neritidae
- Rissoidae – Cassidae – Leptonidae
- Haliotis – Conidae – Général worldwide collection
- Turridae – Mitridae – Costellaridae
- All families in the northwestern Atlantic

À la question êtes-vous spécialisés dans une région particulière, 36% ont répondu par la négative, pour les autres
16,8% des membres sont spécialisés dans la région européenne.
2,8% des membres sont spécialisés dans la région africaine.
5,6% des membres sont spécialisés dans la région asiatique.
5,6% des membres sont spécialisés dans la région américaine.
2,8% des membres sont spécialisés dans la région océanienne.
Autres régions : Arabie – Arctique – Australie – France – Belgique – Famenne et Calestienne – Réunion – Madagascar – Antilles Française

Nous sommes particulièrement étonnés et fiers de compter une telle variété de spécialisations parmi nos membres, et encore, faut-il le rappeler, sur 24 % de nos membres. Nous espérons de tout cœur que cela nous apportera articles et conférences dans un proche ou lointain avenir. Merci d'avance.

Remarques ou suggestions des membres

❖ Souhait d'un membre de la réalisation d'une excursion à la côte belge. ***Nous avons déjà visité la côte belge et nous y retournerons certainement.***

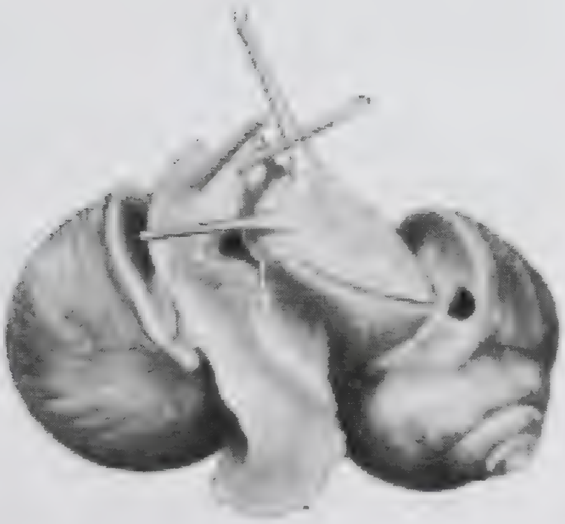
❖ Organiser une réunion commune par an avec la BVC (Une à Anvers, l'autre à Bruxelles). ***Cela s'est déjà fait il y a quelques années, mais nous pourrions évidemment reprendre contact dans ce sens. Nous prenons bonne note de la remarque.***

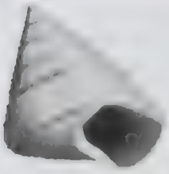
❖ Demander à des malacologues étrangers d'écrire 1 ou 2 pages pour Novapex/Société sur leurs travaux et centres d'intérêt. ***C'est une bonne idée mais nous pensons qu'elle sera difficile à mettre en pratique. Du moins nous essayerons. Nous aimerions que la personne qui a formulé cette suggestion nous contacte afin d'en discuter.***

❖ Faire paraître dans les revues étrangères une pub de la SBM sous forme rédactionnelle dans le texte avec nos caractéristiques et qui fait quoi.

❖ Réussir à obtenir des entrées aux collections des musées à Bruxelles ou ailleurs en se référant à la SBM.
❖ Augmenter la cotisation pour faire plus. ***La cotisation sera augmentée de 5 petits euros l'an prochain, mais croyez-nous, avec 5 euros en plus par membre, ce ne sera pas pour en faire plus, mais surtout pour pouvoir en faire autant.***
❖ Rapprochement entre l'AFC, la SFM et la SBM pour la coédition d'une revue à standard scientifique et destinée prioritairement à un public francophone (France, Belgique, Suisse, Canada, Afrique francophone) avec bien entendu une bonne dose d'articles en anglais. La SFM cherche un renouveau pour la revue Haliotis trop centrée sur l'étude des espèces de la conchyliculture. ***Qui est volontaire pour se charger de ce point très intéressant certes, mais qui demandera un travail à temps plein !***
❖ Aider certains membres qui ont peur de s'adresser aux spécialistes pour la détermination de certaines coquilles inconnues du membre. ***Mais nous ne demandons que cela ! Nous le faisons d'ailleurs très régulièrement lors de nos réunions.***
❖ Fusionner avec d'autres publications similaires assumerait une meilleure pérennité et enrichirait la publication. ***Voir 2 points plus haut.***
❖ Souhait d'avoir plus de membres en collaborant avec l'AFC et La COA pour soit
1) proposer des abonnements communs à prix intéressants
Ce système fonctionne depuis peu, nous avons un accord avec plusieurs sociétés concernant les paiements groupés et le membre obtient ainsi une réduction lors d'un abonnement.. Le résultat est très décevant surtout que certaines sociétés ne participent absolument pas.
2) Obtenir leur autorisation d'envoyer un numéro à tous leurs membres.
❖ Inviter une fois par an un Malacologue étranger pour faire un exposé. ***Cela a déjà eu lieu et nous y penserons encore à l'avenir, encore faut-il que nous ayons une participation suffisante de la part du public, c'est-à-dire: vous !***
❖ Insister sur certains articles de Novapex lors des réunions par ex : pourquoi *Daphnella* est passée des Turridae aux Conidae [vol 7(1) 2006 17-20]. ***Nous attendons vos questions ! Le service de messagerie électronique est fait pour cela. Vous posez vos questions et nous tacherons d'y répondre lors d'une réunion.***
❖ I enjoy Novapex scientific information; Novapex/Société is good for my reading French. ***ben voilà une note très positive !***
❖ Novapex articles are very well written and presented. I enjoy these very much. ***Thanks !***
❖ Novapex/Société- I especially find the " Nous avons reçu" section useful. Since I can't subscribe to all potentially useful malacological journals, this section helps me to narrow down the journals I should read. ***This is the reason of this section and we are pleased it is useful for some of you.***

Le conseil d'administration de la Société Belge de Malacologie vous remercie vivement pour avoir bien voulu prendre un peu de votre temps pour répondre à ce questionnaire et pouvoir ainsi nous aider à améliorer à chaque instant notre ASBL. Un grand merci à tous.





In Memoriam

Roland HOUART, Christiane DELONGUEVILLE & Roland SCAILLET

Dr. Maurice JAY

C'est avec une grande tristesse que nous avons appris le décès du Docteur Maurice Jay, survenu le 9 juin 2008. Le Dr. Jay était âgé de 83 ans.
Il avait non seulement publié quelques articles chez nous (voir liste ci-dessous) mais il m'avait personnellement également aidé en me prêtant du matériel de la Réunion pour mes articles sur les Muricidae.
Les membres du comité d'administration présentent leurs plus sincères condoléances à son épouse, ses enfants et toute sa famille.

Articles du Dr. Maurice JAY publiés chez nous:

Drivas, J. & Jay, M. 1997. On a collection of Columbellidae from the Red Sea. *Apex* 12(1): 27-30.

Drivas, J. & Jay, M. 1997. On a collection of Columbellidae (Mollusca: Gastropoda) from the west Indian Ocean region (Madagascar, Glorieuses Islands, Comore Islands, and nearby banks and coral shawls) with descriptions of three new species and a new genus. *Apex* 12(1): 31-42.

Drivas J. & Jay, M. 1997. On a collection of Columbellidae from the Red Sea (erratum). *Apex* 12(2-3).

Jay, M. & Drivas, M. 2002. The Cerithiopsidae (Gastropoda) of Reunion Island (Indian Ocean). *Novapex* 3(1): 1-46.

Roland Houart

Giovanni BUZZURRO

Giovanni Buzzurro est décédé…

La disparition de Giovanni Buzzurro, en avril de cette année, nous a beaucoup touchés. Et pourtant nous ne l'avions jamais rencontré ! Ce malacologue italien avait 57 ans. Il était né en 1951, comme nous ! Il collectionnait les mollusques de Méditerranée et les récoltait lui-même en se rendant sur place, comme nous ! Depuis plusieurs années, nous correspondions et il répondait chaque fois avec empressement et précision, toujours désireux d'aider.
Giovanni nous a fourni des renseignements concernant ses récoltes d'*Ergalatax junionae* à Chypre. Sachant que nous préparions un article sur le sujet, il nous avait promis de chercher de nouveaux spécimens en d'autres localités de l'île et dès son retour, il avait envoyé un mail avec le nom de la localité et le nombre d'exemplaires récoltés.
De même, il nous demandait des renseignements concernant ce que nous avions trouvé en d'autres endroits de la Méditerranée ou même des recherches bibliographiques. Ces échanges se faisaient en toute franchise et avec sincérité. Notre article concernant *Ergalatax junionae* est paru quelques jours avant sa mort et il n'a probablement pas eu l'occasion d'en prendre connaissance.
Giovanni n'est pas le seul malacologue avec qui nous entretenons ces échanges de courriers et de courriels. D'autres malacologues italiens, mais aussi des malacologues d'autres pays du bassin méditerranéen et d'Europe correspondent régulièrement avec nous. A ceux là aussi, nous pensons aujourd'hui, car tout comme Giovanni, nous ne les avons jamais rencontrés et pourtant ils nous aident avec gentillesse et nous essayons d'en faire de même. A tous, portez-vous bien, ayez une pensée pour celui qui vient de nous quitter et avec qui nous partagions la même passion.

Ciao Giovanni !

Christiane Delongueville & Roland Scaillet

Quelques nouvelles publications

Roland SCAILLET & Roland HOUART

MARINE AND BRACKISH WATER GASTROPODA OF RUSSIA AND ADJACENT COUNTRIES: AN ILLUSTRATED CATALOGUE

par **Yu. I. Kantor & A.V. Sysoev**

KMK Scientific Press Ltd. - Moscow, 2006.

Морские
и солоноватоводные
брюхоногие моллюски
России

Nous voici devant un superbe catalogue de la faune marine et saumâtre des gastéropodes de Russie et des ex-républiques soviétiques. Cet ouvrage illustré, premier livre bilingue du genre (Russe - Anglais), regroupe 350 genres comprenant 1.240 taxons parmi quelques 110 familles. Pour chaque espèce, les auteurs proposent la référence originale, la synonymie, la localité type et les renseignements concernant la distribution dans la zone concernée. Les 371 pages de texte sont suivies par 140 magnifiques planches couleurs illustrant 1.154 espèces et sous-espèces. Lors du choix des photos, la préférence a été donnée à la représentation des spécimens types qui n'avaient encore jamais été illustrés de la sorte auparavant. De plus, de nombreux individus naturalisés sont représentés avec l'animal et l'opercule. Le catalogue est complété par une large bibliographie totalisant 790 références dont les titres rédigés en Russe, ont été traduits en Anglais.

Les collectionneurs de coquilles européennes apprécieront tout particulièrement ce luxueux ouvrage pour son apport à l'illustration des espèces nordiques et en particulier de celles de la mer de Barents. S'il fallait vraiment se montrer critique, on pourrait peut-être regretter l'absence de cartes illustrant la distribution de chaque espèce.

Gageons que cet ouvrage entièrement consacré aux gastéropodes sera suivi très prochainement par un document de la même qualité traitant cette fois des bivalves. Ce beau livre, format A4, couverture cartonnée et dos cousu, s'achète pour la somme de 85 €, frais de port et TVA non compris sur le site http://www.conchbooks.de. Dépêchez-vous de l'acquérir car seuls quelques exemplaires sont encore disponibles.

Avis aux amateurs et bonne lecture.

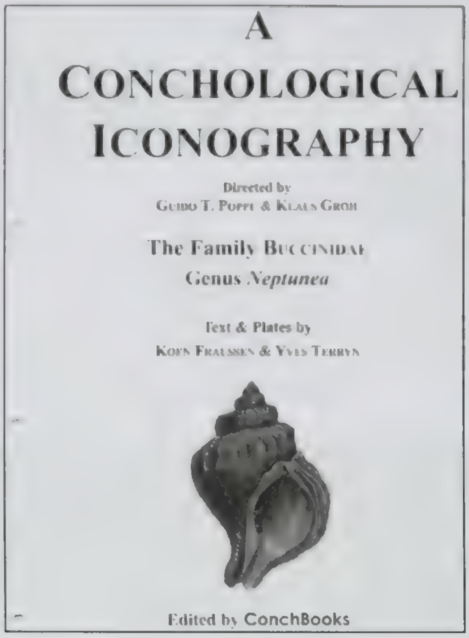
Roland Scaillet

THE FAMILY BUCCINIDAE - GENUS *NEPTUNEA*

par **Koen Fraussen & Yves Terryn**

ConchBooks - Hackenheim, Germany, 2007

Koen Fraussen et Yves Terryn nous offrent ici le résultat d'un superbe travail de synthèse consacré au genre *Neptunea* Röding, 1798: 166 pages de texte pour cerner un sujet ambitieux et 154 merveilleuses planches couleurs pour illustrer ce domaine avec brio. Cet opus ne résume en fait qu'un bref chapitre de la passion de notre ami Koen: une passion qu'il a vouée depuis bien longtemps à l'étude des représentants de la famille des Buccinidae. La page des *Neptunea* est aujourd'hui magistralement écrite et enfin tournée, à nous de la lire et de l'apprécier à sa juste valeur. Espérons qu'il se consacre un jour prochain avec le même bonheur à démêler



A
CONCHOLOGICAL
ICONOGRAPHY

Directed by
GUIDO T. POPPE & KLAUS GROH

The Family BUCCINIDAE
Genus *Neptunea*

Text & Plates by
KOEN FRAUSSEN & YVES TERRYN

Edited by ConchBooks

l'écheveau taxonomique du genre *Buccinum* et à nous faire partager l'ampleur de sa collection par une iconographie aussi complète et aussi belle que celle qu'il vient de nous proposer pour le genre *Neptunea*.
Ce très bel ouvrage est édité par ConchBooks dans le cadre d'une série ambitieuse dirigée par G. Poppe et K. Groh : A Conchological Iconography. Format quarto en pages volantes quadriperforées, ce beau document s'achète pour la somme de 120 €, frais de port et TVA non compris sur le site http://www.conchbooks.de

Amateurs de coquilles des mers froides de l'hémisphère Nord, n'hésitez pas à vous procurer cet ouvrage qui ne pourra que vous apporter bonheur et émerveillement. Bonne lecture.

Roland Scaillet

ENCYCLOPEDIA OF MARINE GASTROPODS

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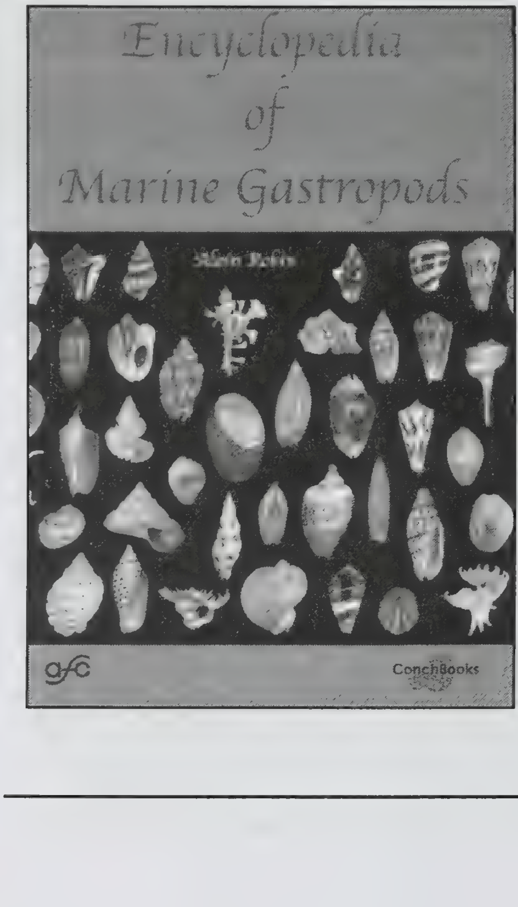

Encyclopedia
of
Marine Gastropods

Alain Robin

gfc ConchBooks

Plus de 5500 espèces de gastéropodes marins sont illustrées dans ce livre grâce à d'excellentes photographies couleurs. Il y a très peu de texte, l'auteur ayant surtout misé sur l'iconographie.

Chaque espèce est illustrée de face et de dos, à raison d'une moyenne de 15 espèces par page. Les légendes sont reprises en bas de page et comportent le genre, l'espèce, l'auteur et la date de description, la taille du spécimen illustré et la localité. Un index d'une douzaine de pages termine cet ouvrage.

Ce livre donne un petit aperçu de tout ce que le monde marin compte comme gastéropodes, et grâce à l'excellente iconographie il nous permet d'admirer la diversité de formes et de couleurs de ce monde très particulier, dont la beauté ne se lasse pas de se faire admirer et de nous étonner chaque jour.

N'oublions pas non plus l'outil que représente le travail d'Alain Robin, car bon nombre d'entre-nous, collectionneurs, plongeurs, amateurs ou autres professionnels pourront identifier leurs spécimens grâce à cet ouvrage de qualité.

Nous attendons avec impatience une suite consacrée aux bivalves marins et aux mollusques non-marins. Leur coquille mérite également une place de choix dans un tel livre. En leur réservant déjà une petite place dans notre bibliothèque commandons déjà celui-ci, il en vaut la peine.

Roland Houart

PHILIPPINE MARINE MOLLUSKS
Vol. I

par **Guido Poppe**

(en collaboration avec de nombreux malacologues du monde entier)

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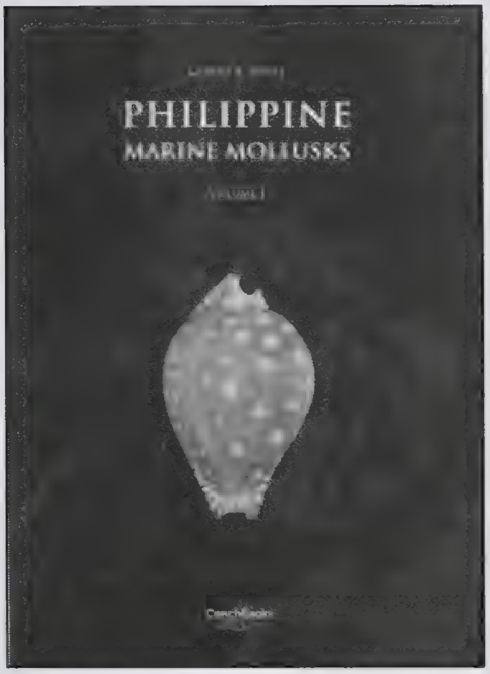

Après divers volumes récemment publiés et dédiés aux mollusques du Japon, de Chine et du Vietnam, voici enfin le premier des 3 volumes consacrés aux mollusques marins des Philippines. Les récentes découvertes faites aux Philippines depuis l'utilisation des fameux filets dénommés "tangle nets", plongés dans les eaux profondes des Philippines vers les années 1980 ont rendu obsolètes ou largement incomplets nombre de publications antérieures. N'oublions toutefois pas "Shells of the Philippines" par Springsteen et Leobrera, publié en 1986, qui reste une référence de base pour la région.
Philippine Marine Mollusks est un projet pensé, mis en route et réalisé par Guido Poppe, qui avec son fils Philippe, a créé "Conchology, Inc.", base incontestée de nouvelles récoltes, de découvertes et de nombreuses nouvelles descriptions.
Basé aux Philippines depuis 2003, Conchology, Inc fut également essentiel à la réalisation de ce livre, publié en 3 volumes. Les diverses expéditions, dont Philippe Bouchet (MNHN) fut et reste le fer de lance ont également contribué pour une large part à de nombreuses nouvelles découvertes et aussi à la mise en place d'une étude sur la biodiversité marine. Les estimations actuelles du nombre total de mollusques marins présents aux Philippines se sont arrêtées sur le chiffre de 15000 espèces dont une large part reste à décrire, ou ... à découvrir.
Pour aboutir à un résultat tel que souhaité pour cet ouvrage, de nombreux auteurs, amateurs et professionnels, ont été mis à contribution et chacun, selon sa ou ses spécialités, a contribué à ces 3 volumes. Le premier volume voit ainsi 22 auteurs pour les quelques 69 familles représentées.
Un préface de Baldomero M. Olivera est suivi d'un deuxième sous la plume de Philippe Bouchet. Tous deux analysent l'histoire de la malacologie, des mollusques et de la biodiversité aux Philippines. Deux préfaces très intéressants, agrémentés de très belles photos. L'introduction, par Guido Poppe, elle aussi retrace l'historique de la malacologie dans cette très belle région.
Les méthodes utilisées et l'origine des coquilles étudiées et illustrées précèdent la liste des auteurs de ce premier volume. La photo de chaque auteur est illustrée, suivie de la liste de la (ou des) familles étudiées et d'une courte bibliographie. Les remerciements précèdent un large chapitre intitulé "The World of Malacology" où se côtoie "le Phylum Mollusca", "Systematics, Taxonomy and Nomenclature", "Terminology", "Where and how to find shells", "Cleaning", "Identifying and Labeling", etc.
D'autres chapitres que je vous laisserai découvrir précède la partie systématique. Les planches photos sont précédées de la liste des familles et des espèces présentes dans ce premier volume.
Les illustrations, sur fond noir, sont excellentes. En regard on trouvera le nom de la famille, l'auteur du chapitre, quelques mots sur la famille, le nom des espèces illustrées, l'auteur, la date de description, la taille, la localité, la fréquence de l'espèce aux Philippines et souvent une ou deux photos de l'animal vivant. Le volume se termine par une courte bibliographie et l'index.
Ces trois volumes couvriront une zone dont certaines espèces se retrouvent du Japon jusqu'en... Afrique du Sud. Un outil indispensable! Commandez-le dès maintenant et réservez déjà les deux autres volumes.

Roland Houart

Quelques nouvelles publications absentes de notre bibliothèque

Note: *Cette rubrique fut absente dans les derniers Novapex/Société pour diverses raisons. Je la reprends ici, surtout que la plupart de ces articles se trouvent dans des revues qui ne sont pas dans notre bibliothèque. Les personnes intéressées peuvent directement s'adresser à moi.*

Roland HOUART

A molecular phylogeny of the Rapaninae and Ergalataxinae (Neogastropoda: Muricidae), par Martine Claremont, David G.. Reid and Suzanne T. Williams. **Journal of Molluscan Studies** (2008) 74: 215–221.

❧

Egg capsules, eggs and embryos of the southwestern Atlantic gastropod *Coronium coronatum* (Gastropoda: Muricidae), par Guido Pastorino, Pablo E. Penchaszadeh & Fabrizio Scarabino. **Journal of Molluscan Studies** (2007) 73: 61–65.

❧

Two new deep-sea muricids (Gastropoda) from Argentina, par G. Pastorino et F. Scarabino. **The Nautilus** 122(2): 107-114 (2008).

❧

Lovell Augustus Reeve (1814–1865): Malacological author and publisher, par Richard E. Petit. **Zootaxa** 1648: 1-120 (2007).

❧

Additions to the annotated list of marine alien biota in the Mediterranean with special emphasis on Foraminifera and Parasites, par A. Zenetos, E. Mer, M. Verlaque, P. Galli, C.-F. Boudouresque, A. Giangrande, M. E. Inar and M. Bileceno Lu. ***Mediterranean Marine Science*** Volume 9/1, 2008, 119-165.

❧

Redescription of *Hiatella meridionalis* d'Orbigny, 1846 (Mollusca, Bivalvia, Hiatellidae) from Argentina, par Luiz Ricardo L. Simone & Pablo E. Penchaszadeh. **Papéis Avulsos de Zoologia** 48/-(14)119-127 (2008).

❧

Revision of the genus *Spinosipella* (Bivalvia: Verticordiidae), with descriptions of two new species from Brazil, par Luiz Ricardo L. Simone & Carlo M. Cunha. **The Nautilus** 122(2): 57-78.

❧

Plicarulostrea, a new genus of Plicatulidae (Bivalvia: Pectinoidea) from Thailand, par Luiz Ricardo L. Simone et Vanessa Simão do Amaral.: 127-135 **The Raffles Bulletin of Zoology** Suppl. n° 18. (2008).

❧

Comparative anatomical study of two species of *semele* from Thailand (Bivalvia: Tellinoidea), par Luiz Ricardo L. Simone et Claudia Heromy Guimarães: 137-149. **The Raffles Bulletin of Zoology** Suppl. n° 18. (2008).

❧

Comparative morphological study of some Tellinidae from Thailand (Bivalvia: Tellinoidea), par Luiz Ricardo L. Simone et Samantha Wilkinson: 151-190. **The Raffles Bulletin of Zoology** Suppl. n° 18. (2008).

❧

A developmental perspective on evolutionary innovation in the radula of the predatory neogastropod family Muricidae, par Gregory S. Herbert, Didier Merle, & Carlos S. Gallardo. **☛④☙⑨🗐 ¶☙③☙❧🗐 ☜❶③③**. 23: 17-32 (2007).

* * *

Three New Pliocene Species of Stramonita Schumacher, 1817 (Muricidae: Rapaninae) from Western South America and the Evolution of Modern *Stramonita chocolata* (Duclos, 1832), par Thomas J. DeVries. **The Veliger** 48(4):247–259 (2007).

* * *

Patterns of extinction and local disappearance of Tropical marine gastropods; contrasting examples from across the north atlantic, par Bernard Landau, Juan Carlos Capelo & Carlos Marques da Silva. **AÇOREANA**, 2007, Supl. 5: 50-58

* * *

Systematic revision of the living species of Bullidae (Mollusca: Gastropoda: Cephalaspidea), with a molecular phylogenetic analysis, par Manuel António E. Malaquias & David G. Reid. **Zoological Journal of the Linnean Society**, 2008, 153, 453–543.

* * *

Adixciones a la fauna de moluscos marinos de la peninsula de Guanahacabibes (I), con la descripción de nuevas especies, par J. Espinosa;, J. Ortea, R. Fernández Garcés & L. Moro. **Avicennia** 19: 63-88 (2007).

PS: Nouvelles espèces de **Turbinidae, Liotiidae, Caecidae, Eulimidae, Triphoridae, Columbellidae, Muricidae, Cystiscidae, et Marginellidae.**

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Nuevos prosobranquios marinos (Mollusca: Gastropoda) del Golfo de Batabanó, plataforma suroccidental de Cuba, par J. Espinosa;, J. Ortea, R. Fernández Garcés & L. Moro. **Avicennia** 19: 89-98 (2007).

PS. Nouvelles espèces de **Naticidae, Columbellidae et Marginellidae.**

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El género *Gibberula* Swainson, 1840 (Mollusca: Neogastropoda: Cystiscidae) en Cuba, con la descripción de nuevas especies. par J. Espinosa & J. Ortea. **Avicennia** 19: 99-120 (2007).

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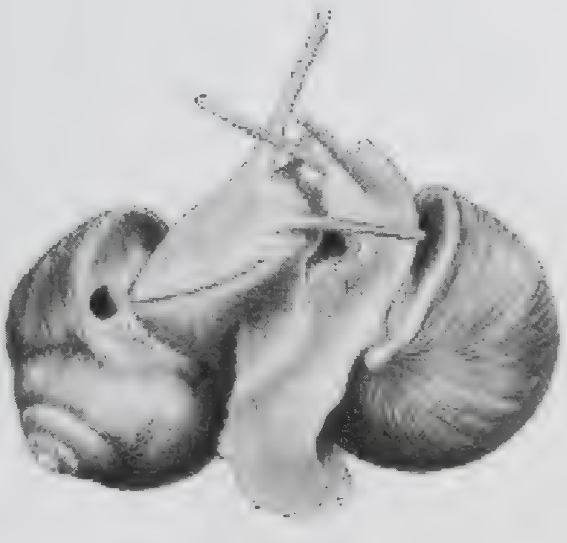

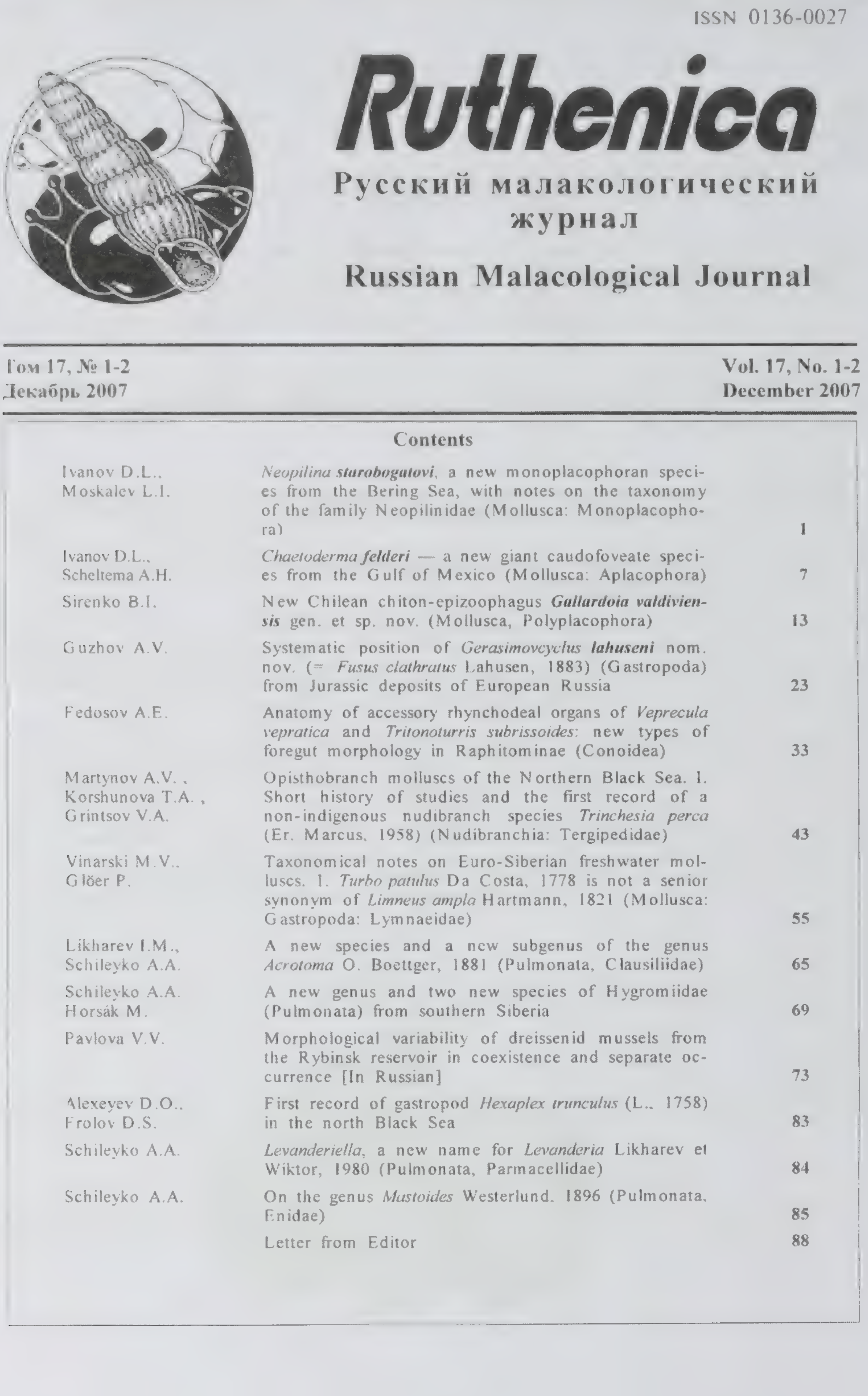

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Russian Malacological Journal

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Декабрь 2007

Vol. 17, No. 1-2
December 2007

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Morceaux choisis

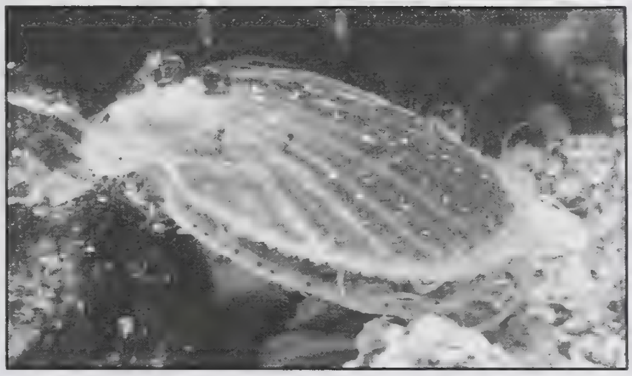
Claude VILVENS

Voici quelques articles concernant les Mollusques et la biodiversité parues ces derniers mois dans diverses revues.

La Recherche : n°419 – mai 2008 – Le pétoncle thermomètre des mers (pp.66-73) par Fabrice Demarthon

Les chercheurs en biologie marine et océanologie du CNRS de Brest ont étudié, dans le cadre d'une mission en Antarctique, le pétoncle austral *Adamussium colbecki*. Objectif : l'utiliser comme indicateur des changements environnementaux dans la région du pôle sud.

Le principe : la coquille des mollusques contient du carbonate de calcium, donc de l'oxygène et cela sous deux formes isotopiques : l'oxygène-16 et l'oxygène-18. Ce dernier, beaucoup moins abondant, est d'autant moins présent dans le carbonate que la température est basse. Dès lors, la mesure du rapport des isotopes donne un indication assez précise sur la température qui régnait lors de la formation de la coquille. Et, c'est là l'intérêt spécifique des Pectinidae ici, comme le production des stries transversales de la coquille s'effectue à un rythme régulier (de l'ordre d'une strie par jour pour un coquille St Jacques européenne, un strie par an pour les espèces des eaux glacées de l'Antarctique), on peut donc dresser une évolution de la température ambiante en fonction du temps. Et si on utilise les Fossiles, on peut même passer à la paléoclimatologie !

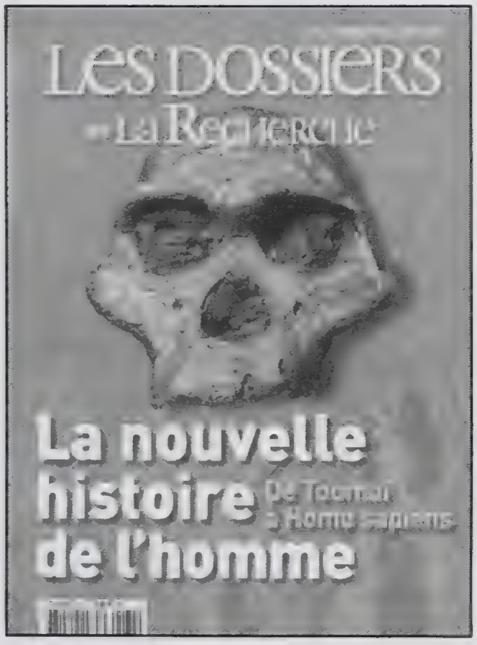


L'article montre et raconte le travail scientifique de terrain réalisé de 2005 à 008.

Une copie est disponible à la bibliothèque de la SBM.

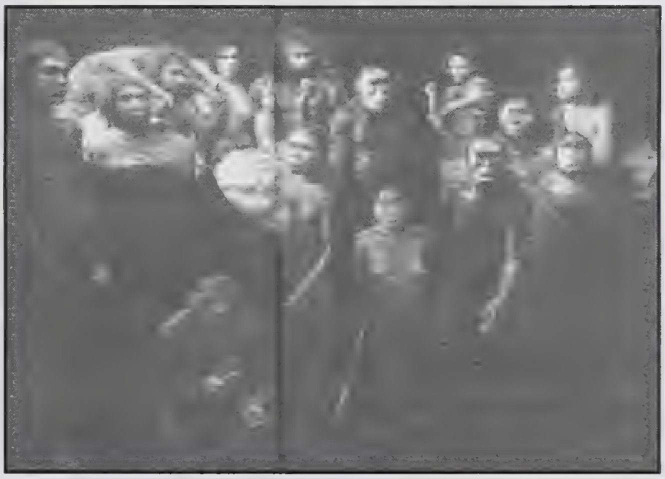
Voir aussi à propos de ce pectinidae : http://peterbrueggeman.com/nsf/fguide/mollusca12.html

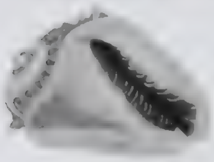
Les dossiers de la Recherche : n°32 – août 2008 – La nouvelle histoire de l'homme : de Toumaï à Homo sapiens.



Bien sûr, ceci ne concerne pas les mollusques – mais tout de même ! Ce numéro présente une passionnante synthèse de ce que l'on sait de l'histoire de notre espèce (*Homo sapiens sapiens*), de note genre (*Homo*) et des genres associés (*Australopithecus, Ardipithecus*, etc), en tenant compte des découvertes les plus récentes. A remarquer particulièrement le synopsis général (p. 16) et "les portraits de famille" (pp.50-57 – illustration ci-dessous). A épingler aussi la réflexion sur la définition du genre Homo lui-même qui mène à la question : qu'est-ce qu'un genre ? On pourrait dire : un clade (ancêtre commun que seulels les espèces considérés partagent) regroupant des espèces appartenant au même grade adaptatif, c'est-à-dire se déplacer de la même façon, manger un même type de nourriture, vivre dans une structure sociale et un environnement similaires.

Passionnant !





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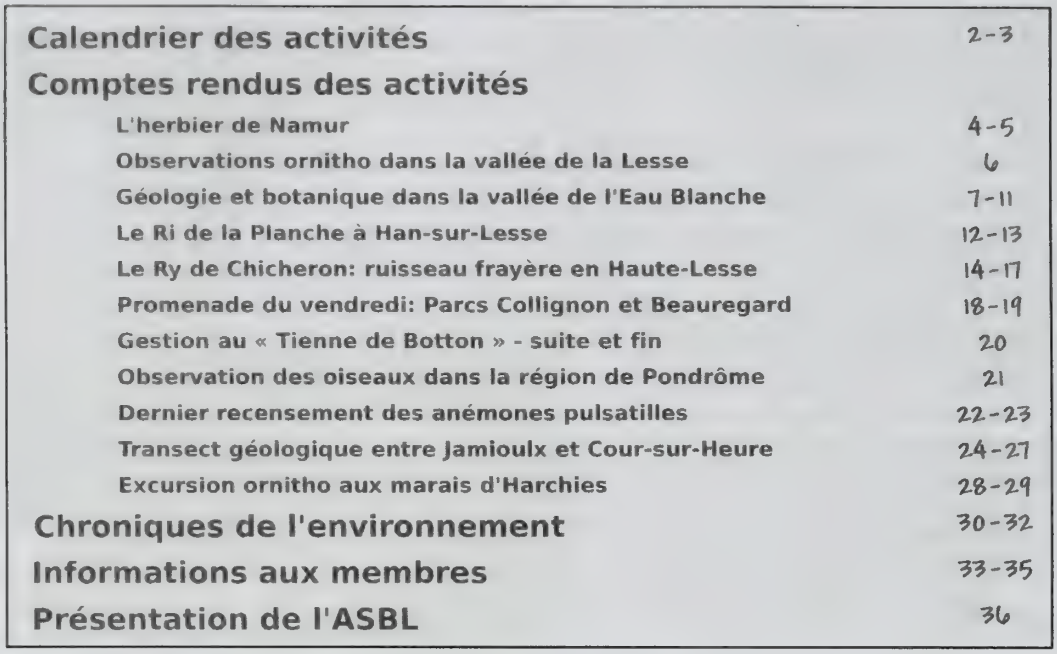
Claude VILVENS

LES NATURALISTES DE LA HAUTE LESSE

(Belgique)
N°241, mai-juin 2008



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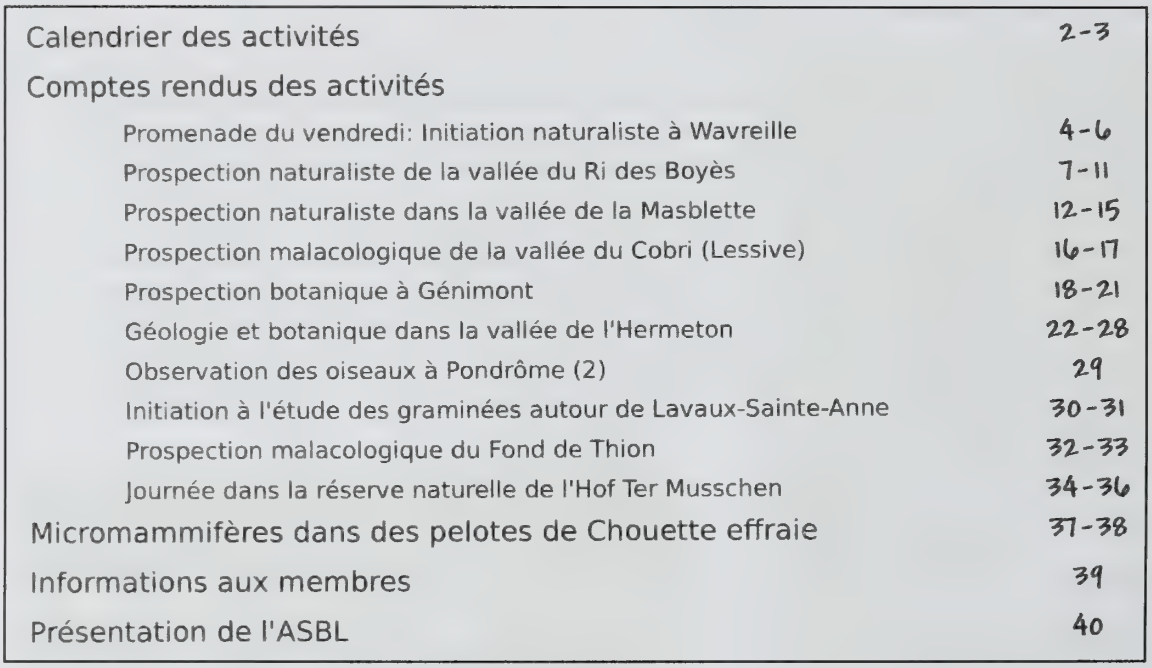

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BULLETIN DE L'INSTITUT ROYAL DES SCIENCES NATURELLES DE BELGIQUE

(Belgique)
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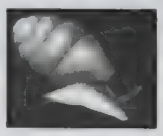

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ANNALS OF CARNEGIE MUSEUM

(U.S.A. – Pennsylvanie)
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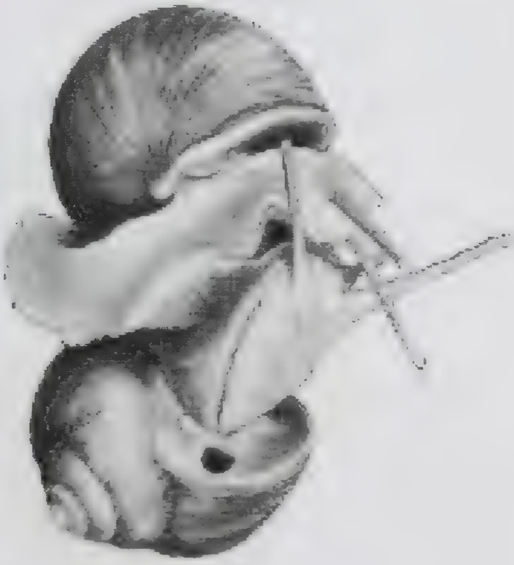

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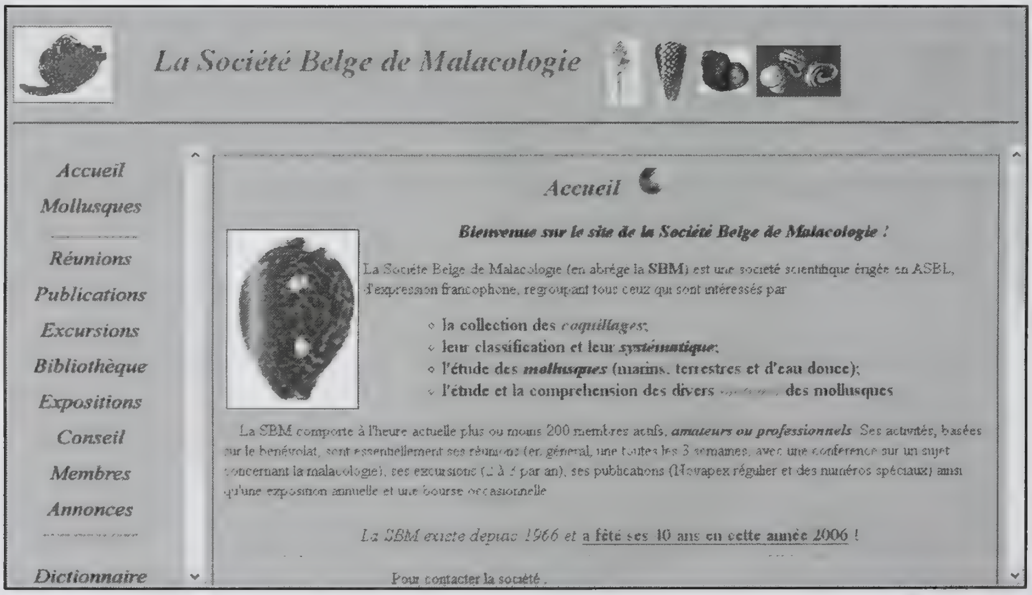

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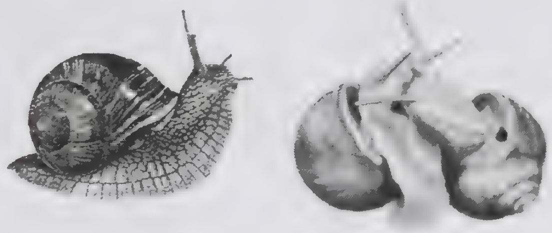

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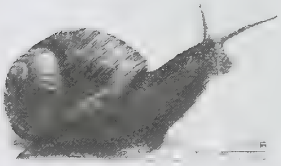

Grandes marées de l'année 2009

Christiane DELONGUEVILLE et Roland SCAILLET

Cette année encore, rien d'exceptionnel concernant les coefficients des grandes marées de 2009. Le maximum est de 111. Néanmoins, cette marée aura lieu en août, ce qui comblera les malacologues aoûtiens. Les juilletistes seront également de la fête. En effet, en 2009, on pourra exceptionnellement faire quelques marées intéressantes du 23 au 25 juillet.

Coefficients (> 100) des pleines mers à Brest

(Les marées basses correspondantes sont donc particulièrement intéressantes à prospecter.)

Janvier	Lundi 12	100 - 102
	Mardi 13	103 - 102
	Mercredi 14	100 - (97)

Février	Lundi 9	(94) - 100
	Mardi 10	104 - 107
	Mercredi 11	108 - 108
	Jeudi 12	106 - 102

Mars	Mardi 10	(95) - 100
	Mercredi 11	104 - 106
	Jeudi 12	107 - 106
	Vendredi 13	104 - 101

Avril	-	-

Mai	-	-

Juin	-	-

Juillet	Jeudi 23	102 - 105
	Vendredi 24	106 - 105
	Samedi 25	103 - 100

Août	Jeudi 20	(98) - 103
	Vendredi 21	108 - 110
	Samedi 22	111 - 110
	Dimanche 23	107 - 103

Septembre	Vendredi 18	100 - 104
	Samedi 19	107 - 109
	Dimanche 20	109 - 107
	Lundi 21	104 - (99)

Octobre	Dimanche 18	100 - 100
	Lundi 19	100 - (98)

Novembre	-	-

Décembre	-	-

Comme à l'habitude, nous réitérons nos conseils :

1. Remettez toujours les pierres déplacées en bon ordre.
2. Observez, photographiez et n'échantillonnez que le strict nécessaire.
3. Soyez prudents et renseignez-vous sur les heures des marées à l'endroit où vous vous trouvez.

Bonnes marées !

REFERENCE :

Annuaire des Marées pour l'année 2009 - Tome I - Ports de France - SHOM (Service Hydrographique et Océanographique de la Marine) - *Paris - 201 p.*

Pêche à pied à la pointe de Kerpenhir (Morbihan)

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G. Thomas WATTERS

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The morphology of conglutinates and conglutinate-like structures in North American freshwater mussels: a scanning-electron microscopy survey

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ABSTRACT. Conglutinates and conglutinate-like objects of 60 species of North American freshwater mussels were examined using scanning-electron microscopy. These structures were found to have a complexity and range of form previously unrealized. They may be organized into groups having similar morphologies. These groups approximate the currently recognized higher taxa and will serve to bolster support for them as phylogenetically coherent groups. In particular the genera *Ptychobranchus*, *Dromus*, *Obliquaria*, *Lasmigona*, and *Strophitus* have unique conglutinate-like structures. Superconglutinates most closely resemble collections of amblemine conglutinates. The results of this study may be used in conjunction with other phylogenetic databases (genetic, adult morphology, behavior, etc.) to construct phylogenetic associations based on a more whole-animal approach.

INTRODUCTION

Freshwater mussels of the Unioniformes have complex life cycles involving a parasitic larval stage, the glochidium. This parasite typically attaches to vertebrate hosts, usually fishes but occasionally amphibians (Watters, 1997; Watters & O'Dee, 1998). Reports of mussels using crustaceans (Walker, 1981; Panha, 1990) have been for non-North American taxa. Glochidia were discovered by Leeuwenhoek in 1695 and illustrated for the first time by him in 1697. Carus (1832) demonstrated that glochidia were larval freshwater mussels rather than parasites infesting freshwater mussels, an idea originally championed by Rathke (1797). But it was not until 1862 that the parasitic nature of glochidia was discovered. In that year Houghton reported finding glochidia attached to fishes and suggested that they may be parasites.

Conglutinates are packages of glochidia released by the female mussel. The concept of conglutinates as vehicles for glochidial infestation was much slower to evolve. As early as 1826 Prévost had noted the presence of an *agglomération* of *animicules* in the female mussel's gills. Lea (1834) illustrated the conglutinate of *Strophitus undulatus* without further comment. Forel (1866) proposed that glochidial threads attached to fish; these were illustrated by Schierholz (1889). Lefevre & Curtis (1910) were the first to apply the term "conglutinates" to these structures, although other authors had referred to them as "placenta" and "ovisacs." Few reports have been published since, most anecdotal (Conner, 1907; Ortmann, 1913; Utterback, 1931) or incorrect (Lefevre & Curtis, 1911).

Watters (1999, 2002) found unprecedented complexity in the "conglutinates" of *Ptychobranchus fasciolaris* and *Strophitus undulatus*. It was clear that these reproductive structures were sufficiently diverse in form and function to harbor phylogenetic information. Although recent phylogenetic studies have focused on allozyme, genetic, gross adult morphology, or reproductive patterns, none have used conglutinate information. The purpose of this study was to examine, using scanning electron microscopy (SEM), a wide variety of conglutinate-like structures. These data should be combined with other information (genetic, morphological, etc.) in further studies to generate phylogenies using a more whole-animal approach.

METHODS

Sixty North American taxa were used in the study (Table 1). Specimens were taken primarily from the Ohio State University Museum of Biological Diversity, Columbus, Ohio, USA (OSUM). Additional samples were supplied by colleagues (see Acknowledgments and captions). Every effort was made to use fully-developed conglutinates but in some cases the glochidia had not completely matured.

Preparation of samples for SEM consisted of fixation in 4% paraformaldehyde and 2% glutaraldehyde in a 0.1 M phosphate buffer with 0.9 % NaCl for 1-2 hrs. Specimens were rinsed in the same buffer, post-fixed in 1% osmium tetroxide in buffer, and dehydrated in graded ethanol. They were critical point dried in ethanol-CO_2 in a Pelco CPD2, and sputter-coated with gold-palladium. Specimens were viewed with a Philips XL30 scanning electron microscope at an accelerating voltage of 20 kV.

RESULTS

Taxa were organized into groups having morphologically similar conglutinate-like structures (Table 2). Images of the structures are shown in alphabetical order by taxa in figures 1-64.

DISCUSSION

Morphology

Examination of the 60 species clearly indicates that an unexpected diversity of "conglutinates" exists. Closer inspection revealed possible phylogenetic associations between the taxa based on "conglutinate" features. It also was apparent that the structures were not of a single morphological type. This necessitates new terms to deal with this heterogeneous group.

Structural programmed eggs (SPE). These are unfertilized eggs that become a structural component of the conglutinate, often giving color and shape to the structure. Glochidia are embedded or attached to this core or layer of SPE. The SPE are held together by the adhesion of the egg membranes. It is possible that the animal has the ability to "turn off" certain egg cells so that they are never fertilized, but become SPE instead.

Conglutinate. The term "conglutinate" is here restricted to those structures composed solely of glochidia or a combination of glochidia and structural programmed eggs (SPE) that are held together by the adhesive properties of the egg membranes, although glochidia may be tethered by their glochidial threads. Those conglutinates lacking SPE are referred to as *simple conglutinates* and those having SPE are referred to as *composite conglutinates*. Simple conglutinates may be elastic or inelastic. In some cases simple conglutinates may be collectively assembled into *superconglutinates*.

Composite conglutinates occur in three forms: A, B, C.
In *composite A conglutinates* the glochidia are untethered to the core of SPE and are held in place by the adhesive egg membranes. The glochidia are distributed throughout the SPE core. Composite A conglutinates have been found in *Fusconaia* and *Toxolasma*.
In *composite B conglutinates* the SPE form a central ribbon to which the untethered glochidia are attached along the lateral two margins. Composite B conglutinates have been found only in *Dromus*.
Glochidia are tethered by means of their glochidial threads to the SPE core in *composite C conglutinates*. Threads are distally fused to the inner lining of the glochidial egg membrane (Fig. 33). The SPE are smaller than the glochidia and tightly bound together by their egg membranes. This type of conglutinate has only been found in *Lasmigona*.

Amorphous mucus conglutinate. Glochidia are released in a loose mucus matrix which eventually disassociates. These conglutinates occur in the Margaritiferidae and the unionid "amblemines" – *Amblema, Megalonais, Quadrula,* and *Quincuncina*.

Mesoconglutinate. Mesoconglutinates are composed of spongy, solid mucus bodies to which glochidia are tethered. Glochidia are originally located within individual chambers in the mesoconglutinate while within the marsupium of the female mussel. Upon release into the surrounding water the glochidia are pushed to the outside by osmotic swelling of the mucus; the glochidia then become infective. This type of "conglutinate" was described in detail by Watters (2002). It is only known from *Strophitus*.

Metaconglutinate. Metaconglutinates are the most complex conglutinate-like structures known and occur only in *Ptychobranchus*. The glochidia are contained in a central core surrounded by an acellular layer. This core in covered by a second acellular outer layer, with a fluid layer between the two. The central core extends to the surface of the outer layer at pigmented "eye spots." The "tail" of the metaconglutinate is adhesive. Examination reveals a series of spongy pads (Figs. 48, 49). Within the cavities of this material are minute spherical objects (Fig. 50), ~ 8 μ. These objects may be "glue balls" – vesicles of some viscous or adhesive liquid. How these function is unknown, but perhaps the vesicles rupture on contact or dissolve. Metaconglutinate mimic models vary from species to species and apparently also during ontogeny, but the overall structure is consistent between all of them.

Phylogeny

No phylogenetic analysis to date has used any conglutinate information. This study indicates that there is sufficient morphological complexity to form conclusions concerning the phylogenetic relationships between the species included here. These data may be used either independently (as here) or in conjunction with existing morphological, behavioral, and genetic information to create a better picture of the evolution of this group. This study supports the recognition of suprageneric phylogenetic groups based on genetics by several recent workers. These groups and others are discussed below.

Strophitus. Simpson (1900) separated *Strophitus* from all other unionids on the basis of the placement of the marsupium (outer gills) and nature of the "ovisacs." He placed *Strophitus* in his Diagenae, used by him in the sense of a subfamily. This study supports the uniqueness of this genus. The mesoconglutinate is found in no other genus. *Strophitus* was associated with *Pyganodon* and *Anodonta* (Hoeh et al., 2001) and with *Lasmigona* (Campbell et al., 2005) by DNA evidence. That result is supported by this study, but the uniqueness of the mesoconglutinate suggests that *Strophitus* is a distinct lineage. *Strophitus* mesoconglutinates may be functionally derived directly from the presumably ancestral amorphous mucus conglutinate by the "firming" of the mucus into a solid rod.

Dromus. The monotypic *Dromus* was placed in his Eschatigenae by Simpson (1900) based on marsupial and conglutinate characteristics. Starobogatov (1970) created the Tribe Dromini for *Dromus* in his Subfamily Medionidinae. Indeed, the conglutinate (composite B) has not been found in any other species. The elastic ribbon, composed of SPE with lateral glochidia, could be functionally derived from a *Fusconaia*-like conglutinate, in which genus the SPE form a central core. The conglutinate morphology described here supports the idea that *Dromus* is a distinct lineage.

Lasmigona. This genus is typically placed with the anodontines. The glochidium is typically anodontine and the adult shell tends to have reduced dentition. However, *Lasmigona* is unique in several respects. The glochidia are tethered to a core of SPE. All other taxa having SPE have untethered glochidia. This suggests that one of two things must have happened in the evolution of *Lasmigona*: either SPE arose independently in *Lasmigona* or *Lasmigona* "re-evolved" the tethered condition. In view of the anodontine glochidia found in *Lasmigona*, the improbability of regaining the tethered condition, and its genetic similarities to other anodontines (Lydeard et al., 1996), I suggest that SPE arose independently in *Lasmigona* (SPE may have arose a third time as well, see *Toxolasma*). Although Raley et al. (2003) suggested that *Lasmigona* was paraphyletic, no differences among the composite C conglutinates of four species was found in this study.

Cyprogenia and *Obliquaria*. Simpson (1900) also recognized the uniqueness of *Cyprogenia* and *Obliquaria* and created his Mesogenae to contain them; Starobogatov (1970) placed them in his Cyprogeniinae. Both have conglutinates comprised of glochidia bound by elastic egg membranes. These are elaborations of the typical *Elliptio/Pleurobema* inelastic conglutinates. The morphology of the marsupia suggests that *Cyprogenia* and *Obliquaria* are related; the elastic properties of the conglutinates are probably not convergent. However, *Cyprogenia* and *Obliquaria* are not closely related in recent genetic studies (Campbell et al., 2005). *Obliquaria* has been regarded as lampsiline by some genetic studies (Graf, 2002) but as quadruline in others (Lydeard et al., 1996; Serb et al., 2003; Graf & Cummings, 2006). *Cyprogenia* glochidia have a core of SPE (Eckert & Barnhart, 2003). This condition is similar to *Dromus*; both have an elastic matrix with a central core of SPE. This supports genetic studies that suggest a close relationship between *Dromus* and *Cyprogenia* (Campbell et al., 2005).

Ptychobranchus. Simpson's (1900) Ptychogenae included only the genus *Ptychobranchus* and was based on the folded condition of the gills. Starobagatov's (1970) Ptychobranchinae also recognized the uniqueness of the genus. The metaconglutinate is very different from any other conglutinate-like object studied, both in terms of its complexity and associated structures. It was described in detail by Watters (1999). *Ptychobranchus* is considered related to other "lampsilines" in most studies, including genetic studies (Lydeard et al., 1996; Campbell et al., 2005). But in terms of conchological and conglutinate morphology the *Ptychobranchus* is unlike lampsiline genera such as *Villosa, Lampsilis, Ligumia*, etc. The metaconglutinate is similar to the conglutinates of *Pleurobema* or *Elliptio* but have been encapsulated in pigmented layers. *Ptychobranchus jonesi*, not examined here, is probably not in that genus (Roe, 2000).

Superconglutinates. These structures appear to be collections of *Pleurobema*- or *Elliptio*-like conglutinates. Species having this condition were placed in the genus *Hamiota* (Roe & Hartfield, 2005).

Toxolasma. Like *Lasmigona*, *Toxolasma* has several unique and puzzling features that set it apart from other unioniformes. The adult size is quite small and the mantle is modified into "caruncles." The latter fact has caused its inclusion with the lampsilines. However, the conglutinate is most similar to *Fusconaia* in the presence of untethered glochidia in a SPE core. Recent genetic studies place *Toxolasma* near the base of the lampsiline lineage (Campbell et al., 2005).

Margaritiferidae. Davis & Fuller (1981), using anatomical evidence and electrophoretic data, concluded that the Margaritiferidae was a subfamily of the Unionidae. Smith & Wall (1984) disagreed and reinstated the group as a family. Hoeh et al. (1998), based on Cytochrome C Oxidase Subunit I DNA (COI) sequences, found evidence for separation of the Margaritiferidae from the Ambleminae and Anodontinae - suggesting either three families or three subfamilies. This study examined the conglutinates of the monotypic *Cumberlandia*. The conglutinates are composed of untethered glochidia in a mucus matrix, similar to the presumed ancestral condition of the non-anodontine unionids. The conglutinates differ in being more formed (or less amorphous) than in most unionids having amorphous conglutinates. It is thus different from both the anodontines and the remaining unionids ("Ambleminae" of Hoeh et al., 1998) and weakly supports the differentiation of these three groups.

Phylogenetic associations

The ancestral, pre-parasitic condition probably involved a small number of free-living larvae liberated by the female. These may have become phoretic on passing fishes and this symbiosis eventually evolved into a parasitic relationship (Watters, 2001). The earliest conglutinates may have been amorphous mucus packets or strands that attracted or entangled fishes. The Unionidae diverged into two or three groups, the Anodontinae, Ambleminae, and perhaps the Margaritiferidae. The Anodontinae have glochidia with glochidial threads, which may have been the ancestral condition. These tethers were lost in the Ambleminae (and Margaritiferidae).

The Anodontinae are represented in North America by three groups based on their conglutinates (or lack thereof). In *Strophitus* the mucus became a solid structure with embedded glochidia: the mesoconglutinate. In *Lasmigona* the mucus was lost and some eggs became structural programmed eggs forming a composite C conglutinate. In the remaining anodontines (*Pyganodon, Anodonta*, etc.) the mucus was retained as bundles of threads with the glochidia embedded in them. The Anodontinae are now recognized as a distinct group apart from the remaining unionids, even to the point of being considered a separate family. As a whole, the group has evolved to colonize soft-substrate habitats and are host-generalists. The results of this study support this distinction from the amblemines.

Untethered glochidia embedded in amorphous mucus structures represent the earliest Amblemines. These amblemines are mainly big-river, sculptured taxa, including *Amblema, Megalonaias, Quadrula,* and *Quincuncina*, all confined to the Gulf and Interior drainages. These may be the among the most primitive unioniformes (Watters, 2001).

In the remaining groups the mucus has lost its function of holding the conglutinate together. This job is now fulfilled by the egg membranes, which adhere to each other. These conglutinates are non-elastic and lack SPE. Representatives of this grade of complexity include *Elliptio*, *Cyclonaias*, *Pleurobema,* and *Plethobasis*. One group of amblemines, characterized by *Fusconaia*, have SPE. These conglutinates are termed composite A conglutinates.

From this amblemine group several other groups arose. The combining of conglutinates into a single structure, the "superconglutinate," occurred only in *Hamiota* (Roe & Hartfield, 2005). The formation of elastic egg membranes for greater durability occurred in the genera *Cyprogenia* and *Obliquaria*. The resemblance of the these conglutinates to those of *Pleurobema* suggest a potential phylogenetic relationship to the Ambleminae. The surrounding of the amblemine-like conglutinate with multiple layers to form a metaconglutinate occurred in *Ptychobranchus*. Again, the affinities of *Ptychobranchus* may lie with the amblemines.

In numerous groups the conglutinate has been lost, resulting in a glochidium being released individually rather than in conglutinates. In some cases glochidia may be temporarily bound together upon expulsion but are quickly dissociated. In other cases loose conglutinates may be formed at the end of a brooding season if the glochidia have not been released (Watters, unpubl.). These groups include *Actinonaias, Crytonaias, Ellipsaria, Epioblasma, Glebula, Lampsilis, Leptodea, Ligumia, Medionidus, Obovaria, Potamilus, Truncilla*, and *Villosa*. In most of these groups conglutinate formation has given way to other means of luring hosts – mantle flaps, papillae, tentacles, etc. Most of these genera comprise the "Lampsilini" of numerous authors. Their close relationships are born out by genetic studies (Lydeard et al., 1996; Hoeh et al., 2001; Campbell et al., 2005) and preliminary fossil analysis (Watters, 2001). However, other members of the presumed lampsiline clade, such as *Dromus*, *Cyprogenia*, and *Ptychobranchus*, all appear to be unrelated, based on conglutinate morphology, to those other Lampsilinae but related to each other. This is supported by Campbell et al. (2005) in which these genera (and others) were found to form a separate clade within their Lampsilini apart from other lampsilne genera.

Finally, at least two groups have evolved SPE: *Fusconaia* and *Toxolasma*. The great differences between these two genera (and *Lasmigona*) suggest that SPE are convergently derived. A rearranging of the *Fusconaia* composite A conglutinate yields *Dromus*, having a composite B conglutinate.

The conglutinate and conglutinate-like objects described here have a remarkable complexity and range of form. These structures are of phylogenetic interest because they may be organized into groups having similar morphologies. In general these groups approximate the currently recognized higher taxa and will serve to bolster support for them as phylogenetically coherent groups. The Anodontinae, Ambleminae, and Lampsilinae are recognizable in the conglutinate groups. The Margaritiferidae are less distinct. Support is given to the uniqueness of several genera: *Ptychobranchus, Cyprogenia, Obliquaria*, and *Dromus*. *Lasmigona* is shown to have a unique set of conglutinate characteristics and the taxonomic position of the genus is unclear. Lampsilines have a degenerate conglutinate, apparently the result of a switch to a different host-luring strategy: mantle flaps and lures.

The presence of SPE are intriguing features. SPE have evolved independently in two lineages: *Lasmigona* and *Fusconaia*. It is apparent that some species of mussels have the ability to "turn off" egg cells such that they assume a structural rather than reproductive role. This peculiar trait deserves more study.

This study may be used in conjunction with other phylogenetic databases (genetic, adult morphology, behavior, etc.) to construct phylogenetic associations based on a more whole-animal approach.

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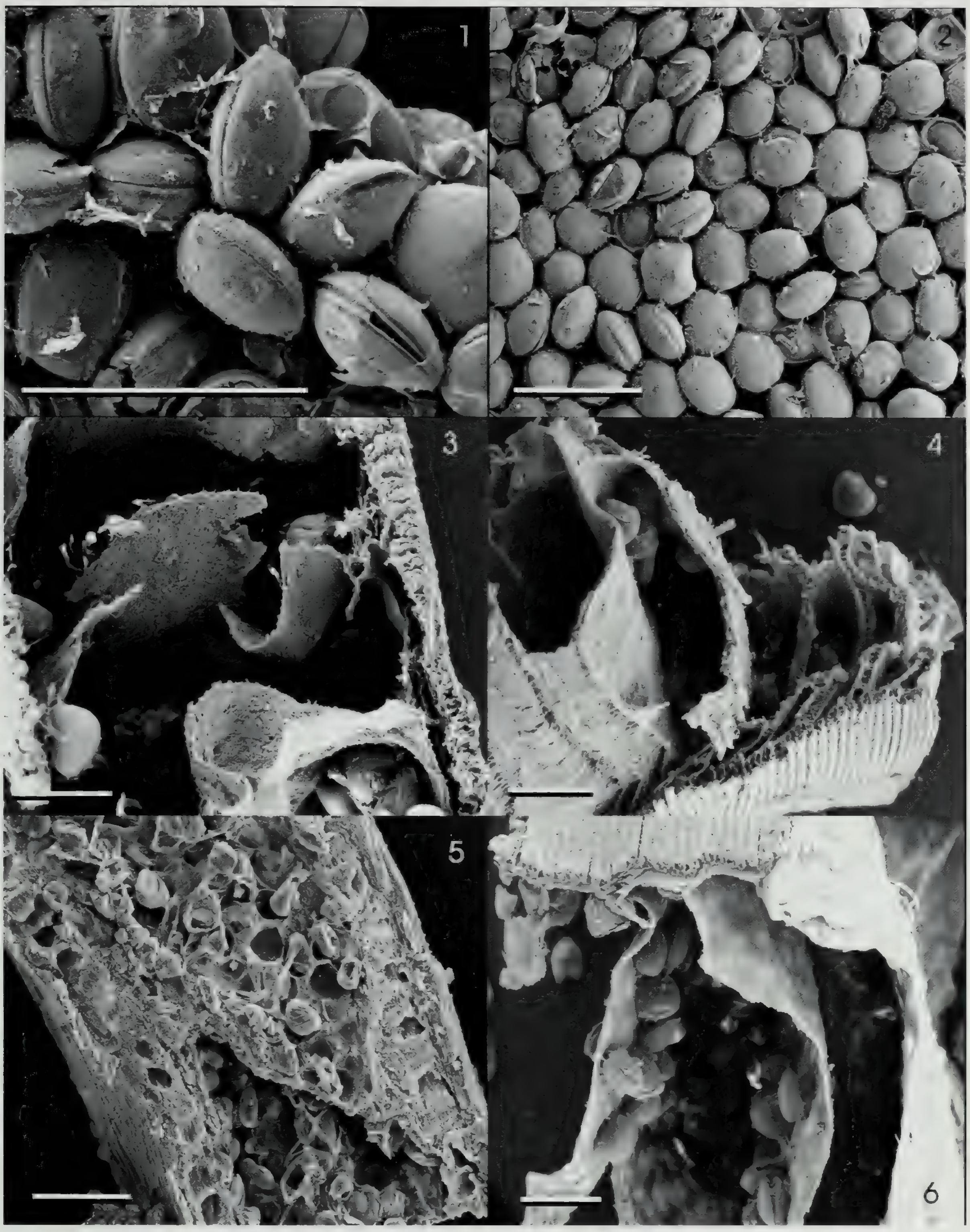
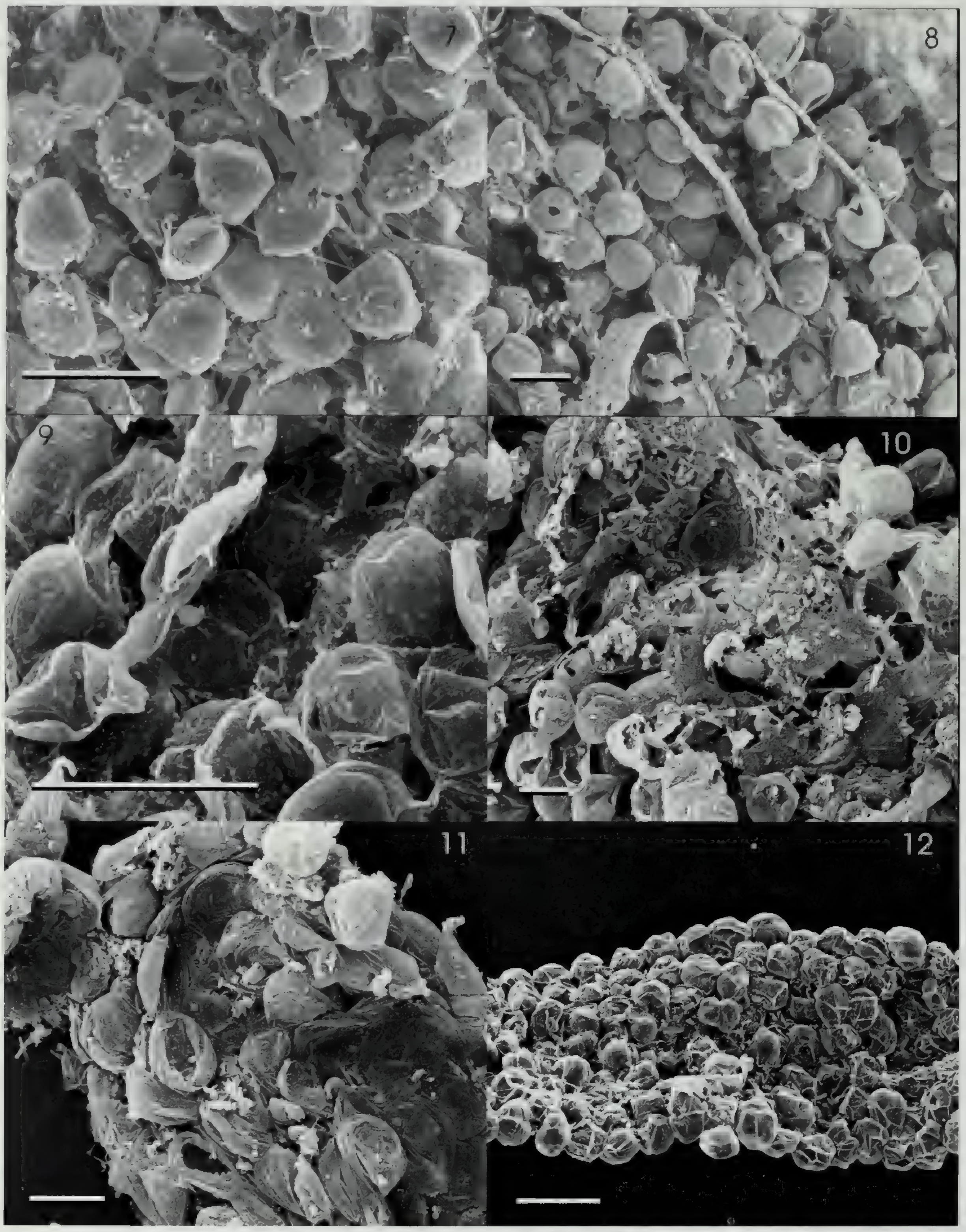


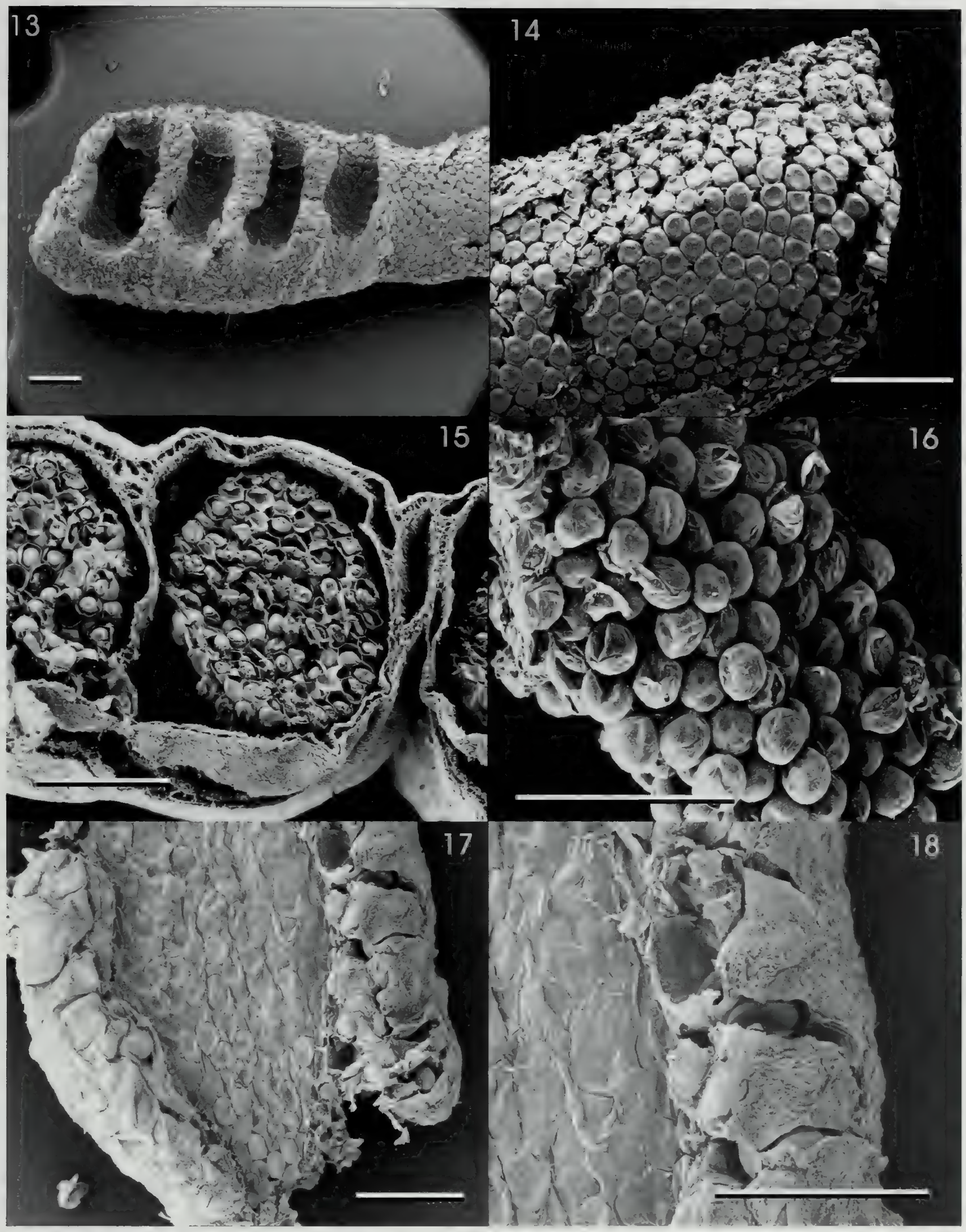
Figures 1-6. Scale bars = 500 μ unless noted otherwise

1, 2. *Actinonaias ligamentina*. OSUM 5980. St. Joseph River, OH. Glochidia with remnants of egg membranes. No conglutinate apparent. **3.** *Alasmidonta marginata*. OSUM 13743. Caddo River, AK. Longitudinal section of marsupium with glochidia. No conglutinate apparent. **4.** *Alasmidonta viridis*. OSUM 21560. Little Darby Creek, OH. Longitudinal section of marsupium with glochidia. No conglutinate apparent. **5.** *Amblema plicata*. OSUM 48918. Muskingum River, OH. Oblique section of marsupium with glochidia imbedded in amorphous conglutinate. Two conglutinates are apparent separated by a water tube wall. **6.** *Anodontoides ferussacianus*. OSUM 31265. French Creek, PA. Longitudinal section of marsupium divided into water tubes with glochidia. No conglutinate apparent.



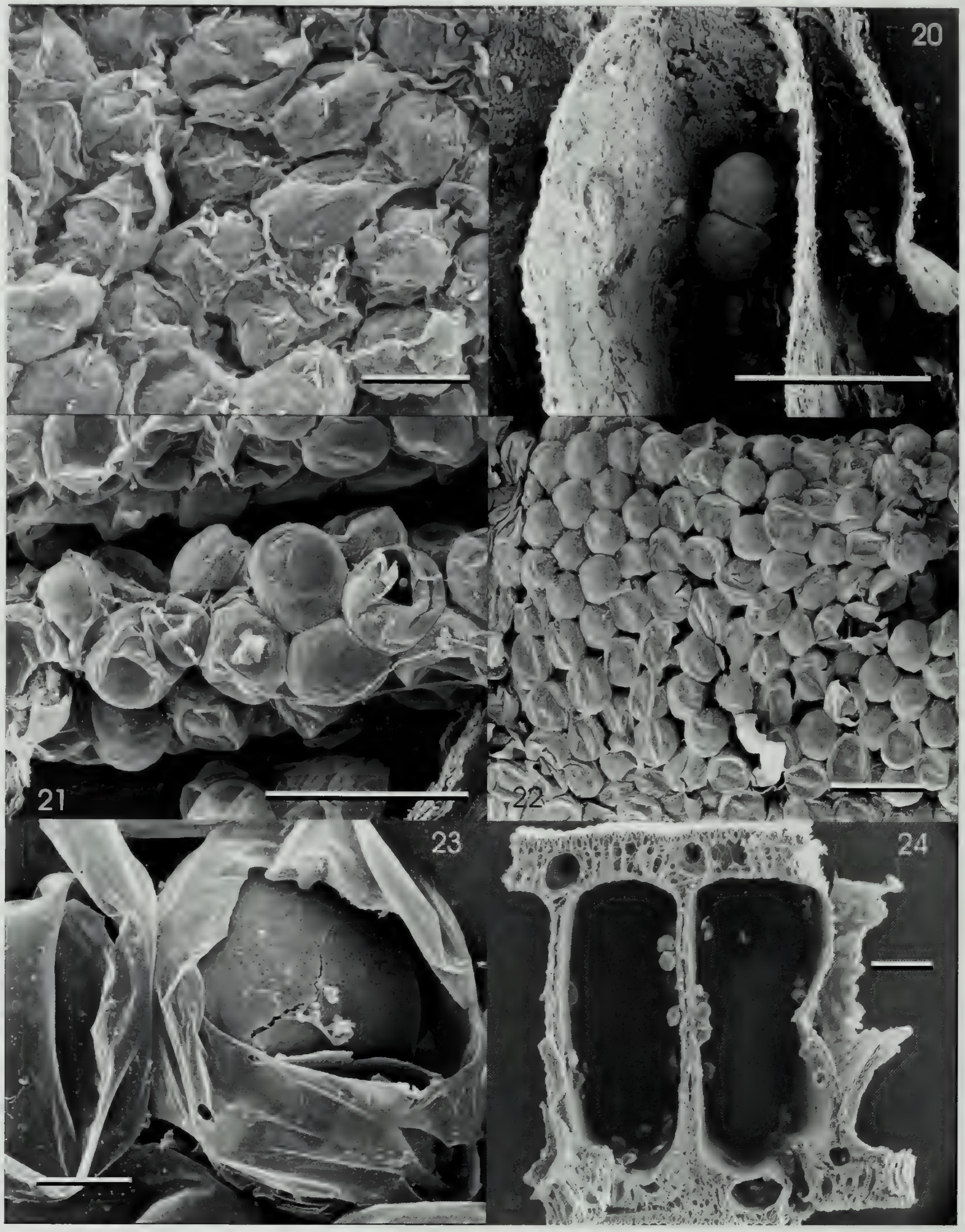
Figures 7-12. Scale bars = 500 μ unless noted otherwise

7. *Anodonta suborbiculata*. OSUM 13634. Black River, MO. Glochidia loosely bound by mucus. **8.** *Arcidens confragosus*. OSUM 52015. Green River, KY. Longitudinal section of marsupium with glochidia. No conglutinate apparent. **9.** *Elliptio spinosa*. OSUM 41069. Altamaha River, GA. Glochidia bound with egg membranes into conglutinate. **10, 11.** *Cumberlandia monodonta*. Ex. M. Hove. St. Croix River, MN. Glochidia imbedded in amorphous conglutinate. Scale bars = 100 μ. **12.** *Cyclonaias tuberculata*. OSUM 14138. Sandusky River, OH. Glochidia bound with egg membranes into conglutinate.



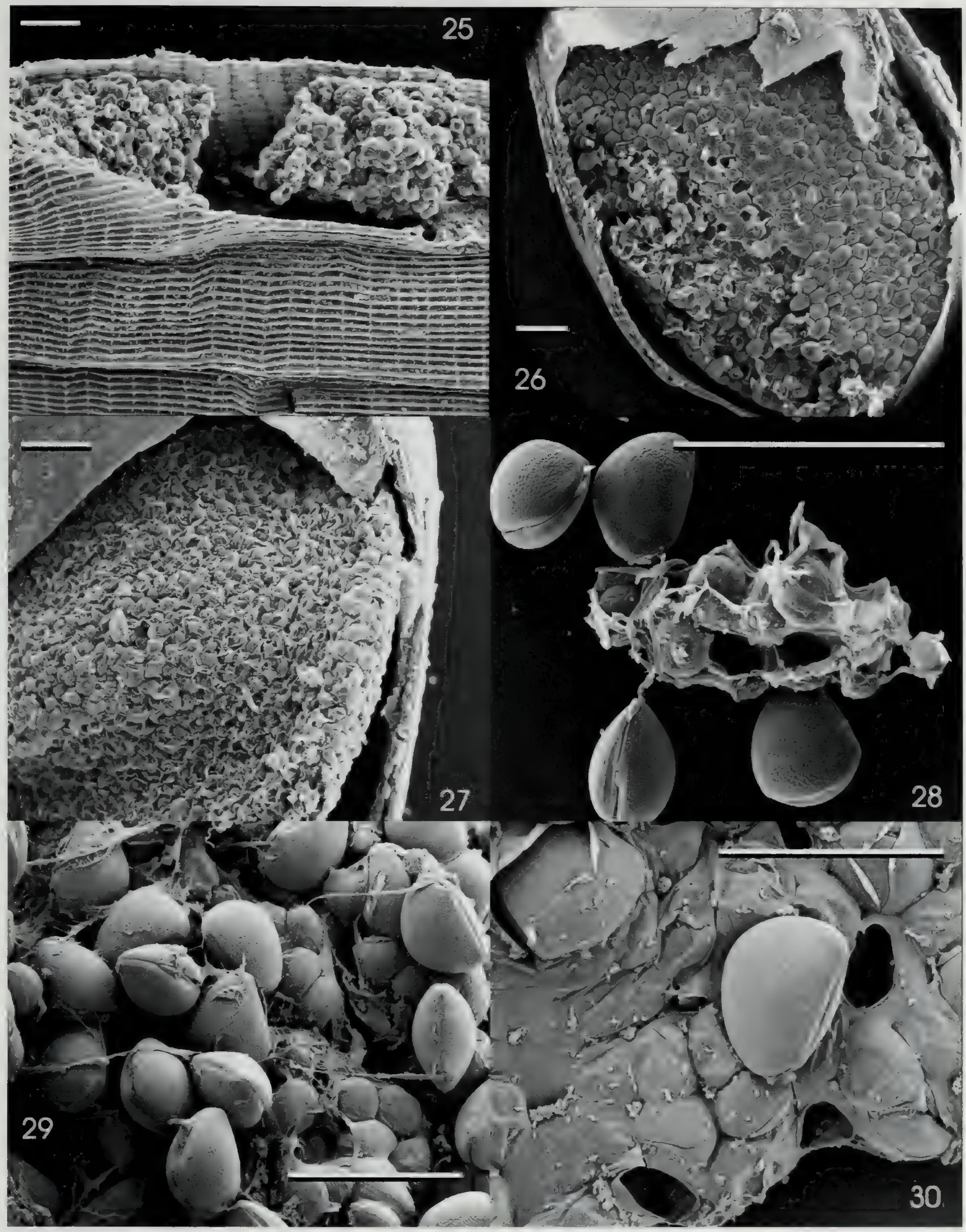
Figures 13-18. Scale bars = 500 μ unless noted otherwise

13, 14, 15. *Cyprogenia stegaria*. OSUM 16757. Clinch River, TN. Glochidia bound with elastic egg membranes into conglutinate. **13.** "Head." **14.** "Stalk." **15.** Cross section showing that the conglutinate is composed solely of glochidia with no SPE. **16.** *Crytonaias tampicoensis*. OSUM 15806. Nueces River, TX. Glochidia forming very weak conglutinate with egg membranes. **17, 18.** *Dromus dromas*. Ex. R. Neves. Clinch River, VA. Composite conglutinate B formed by central ribbon of unfertilized eggs having border of glochidia in thickened membranes.



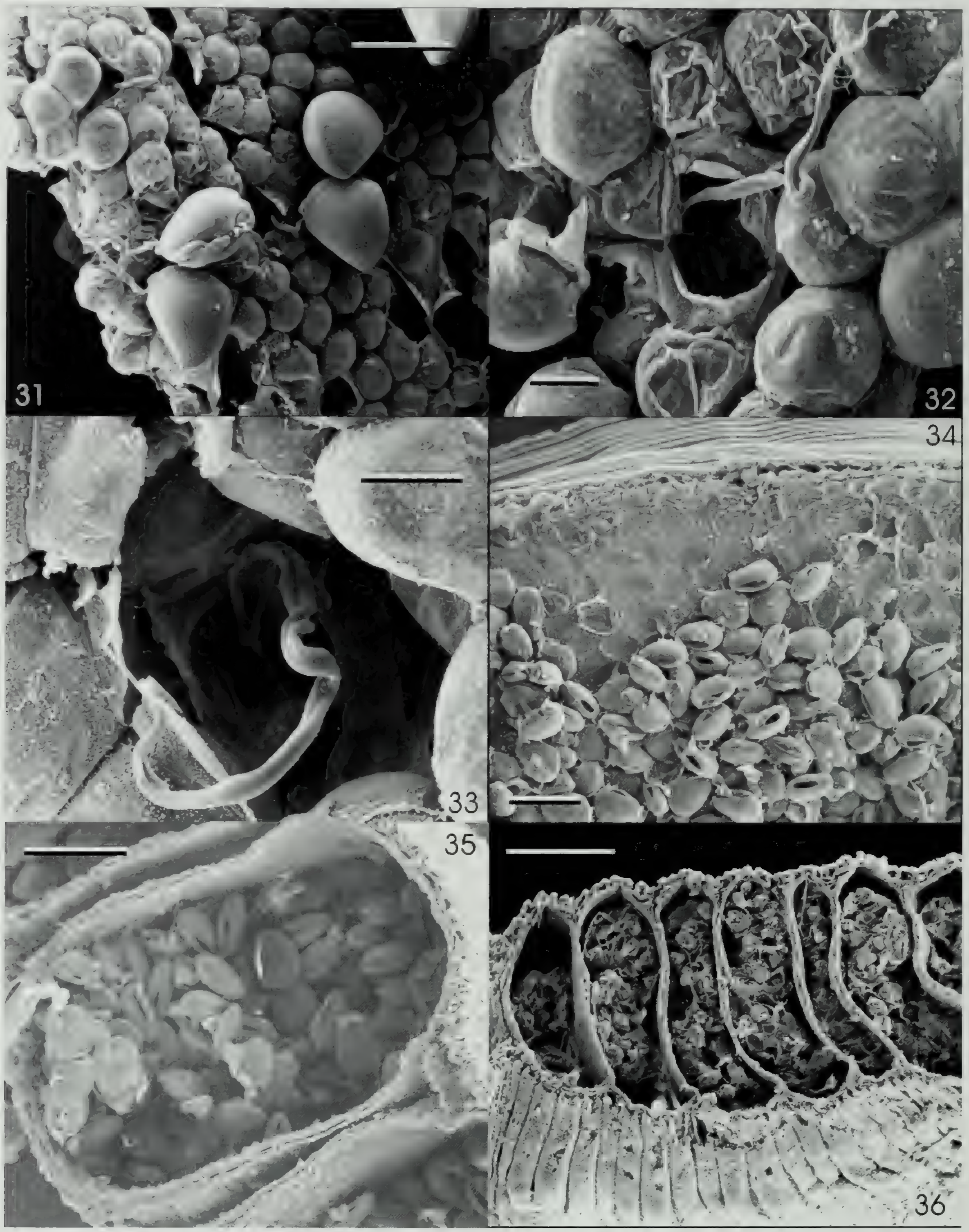
Figures 19-24. Scale bars = 500 µ unless noted otherwise

19. *Elliptio crassidens*. OSUM 15194. Tennessee River, TN. Glochidia bound with egg membranes into conglutinate. Scale bar = 100 µ. **20.** *Epioblasma triquetra*. OSUM 59432. South Fork Scioto Brush Creek, OH. Longitudinal section of marsupium with glochidia. No conglutinate apparent. **21.** *Fusconaia flava*. Ex. G. Watters. St. Joseph River. OH. Glochidia bound with egg membranes into conglutinate. **22.** *Fusconaia maculata*. Ex. G. Zimmerman. Allegheny River, PA. Glochidia bound with egg membranes into conglutinate. Note tight adhesion between egg membranes. **23.** *Fusconaia ozarkensis*. OSUM 54549. War Eagle Creek, AK. Glochidia bound with egg membranes into conglutinate. Scale bar = 50 µ. **24.** *Glebula rotundata*. OSUM 15704. Bayou Teche, LA. Longitudinal section of marsupium with glochidia. No conglutinate apparent.



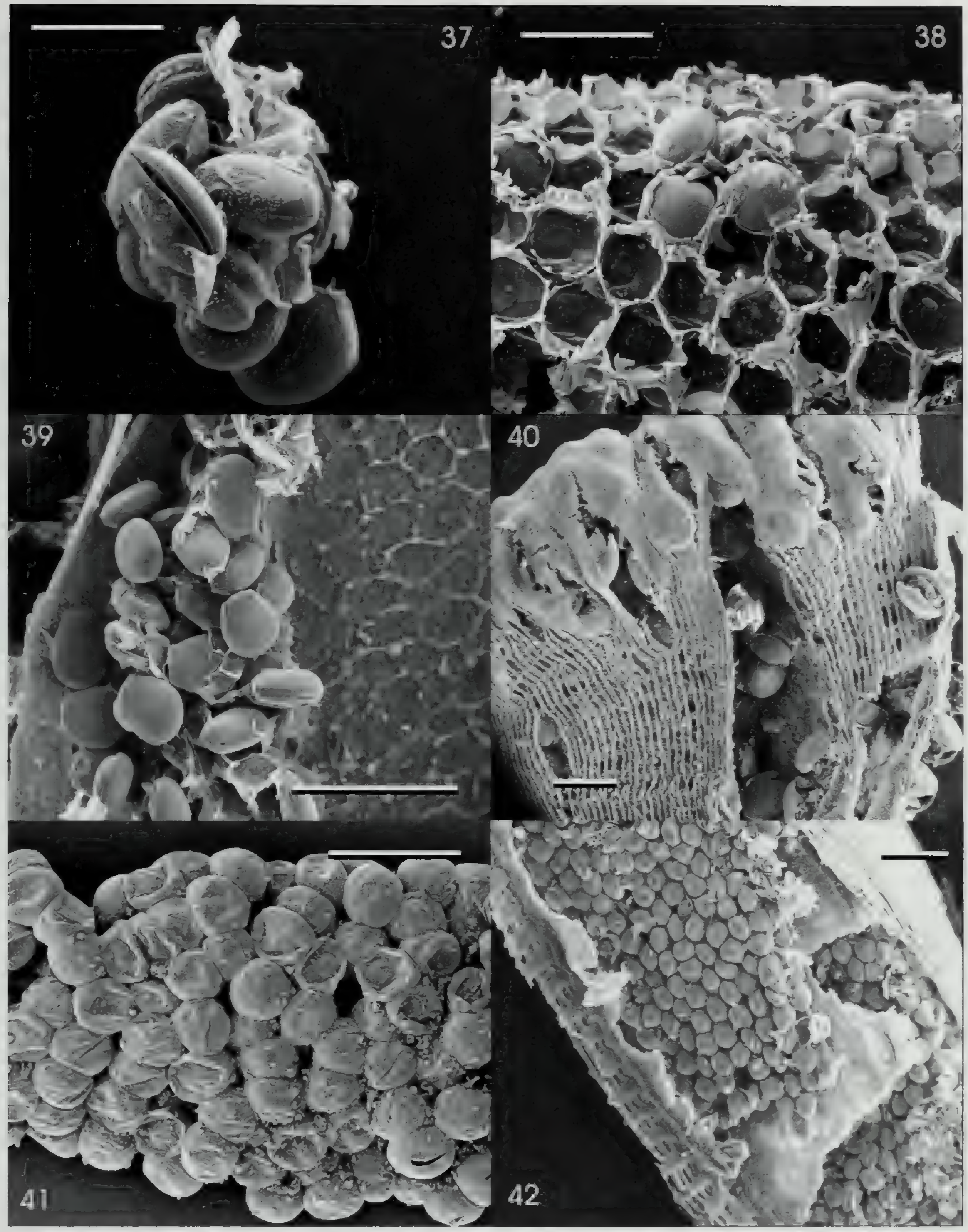
Figures 25-30. Scale bars = 500 μ unless noted otherwise.

25. *Gonidea angulata*. OSUM 8550. Trinity River, CA. Glochidia loosely bound by mucus within a water tube. **26.** *Lampsilis radiata luteola*. OSUM 63569. Lake Erie, OH . Glochidia with remnants of egg membranes in water tube.**27.** *Lampsilis teres*. OSUM 43079. St. Francis, AK. Glochidia with remnants of egg membranes in water tube. **28, 29, 30.** *Lasmigona compressa*. OSUM 67876. Fish Creek, OH. Composite conglutinate C formed by SPE. Glochidia are imbedded in and tethered to the conglutinate. Note the glochidial threads and smaller SPE. The SPE are tightly bound to each other by egg membranes.



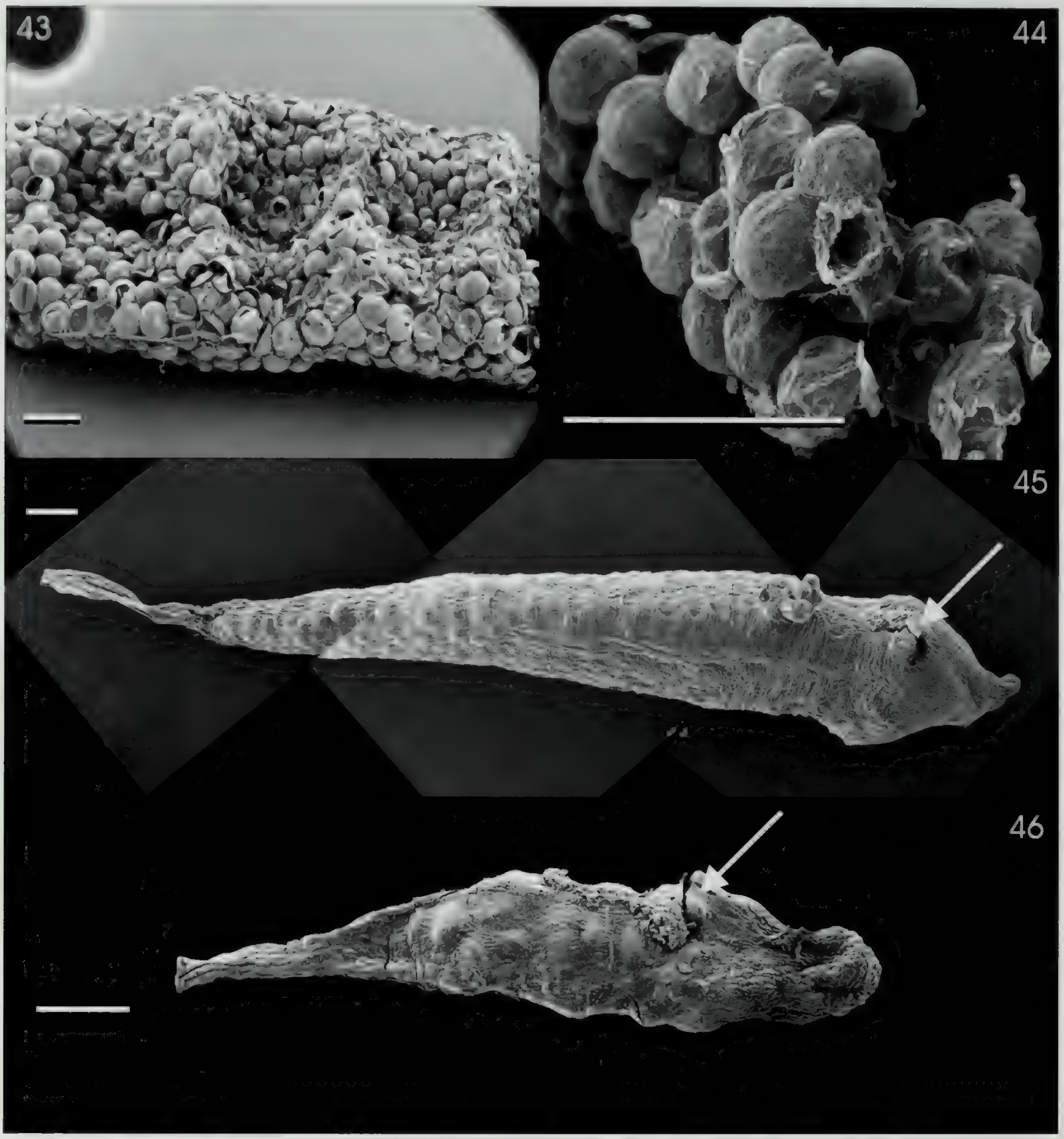
Figures 31-36. Scale bars = 500 μ unless noted otherwise.

31, 32, 33. *Lasmigona costata*. OSUM 65201. Grand River, OH. Composite conglutinate A formed by unfertilized eggs. Glochidia are imbedded in and tethered to the conglutinate. Note the glochidial thread fused with interior of egg membrane in Fig. 33. Fig. 32, 33 - Scale bars = 100 μ. **34.** *Leptodea fragilis*. OSUM 63566. Lake Erie, OH. Oblique section of marsupium with glochidia with remnants of egg membranes. Glochidia lie against the wall of the water tube. No conglutinate apparent. **35.** *Leptodea ochracea*. OSUM 52455. Mashpee Pond, MA. Longitudinal section of marsupium with glochidia in water tube with remnants of egg membranes. No conglutinate apparent. **36.** *Lemiox rimosus*. OSUM 33955. Duck River, TN. Longitudinal section of marsupium with glochidia bound with egg membranes into conglutinates.



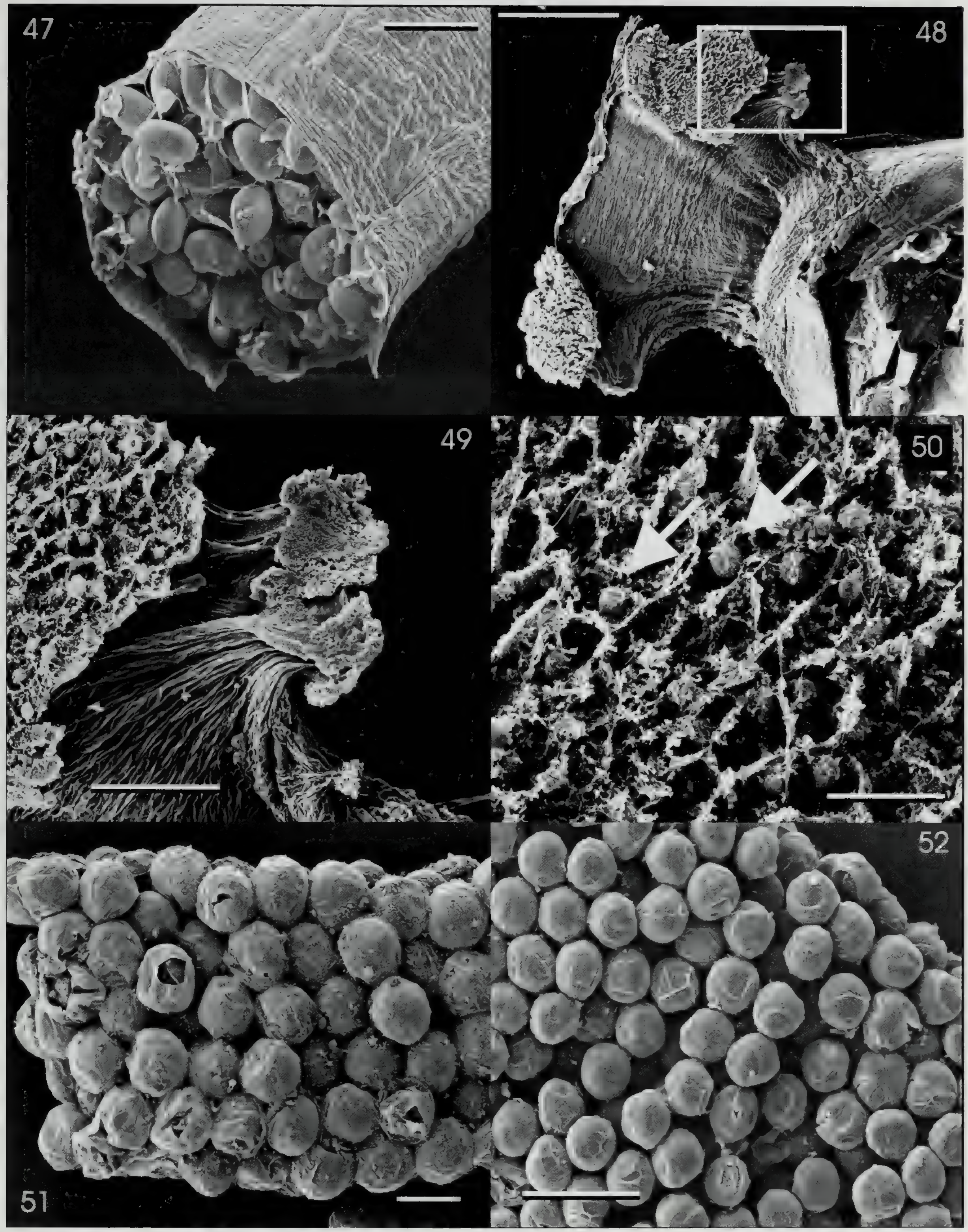
Figures. 37-42. Scale bars = 500 μ unless noted otherwise.

37. *Ligumia recta*. Ex. P. Morrison. Ohio River, WV. Glochidia with remnants of egg membranes. No conglutinate apparent. **38.** *Obliquaria reflexa*. Ex. G. Watters. Muskingum River, OH. Glochidia bound with elastic egg membranes into conglutinate. Note that conglutinate retains its shape even after glochidia have been removed. **39.** *Obovaria subrotunda*. OSUM 61880. Little Muskingum River, OH. Oblique section of marsupium with glochidia with remnants of egg membranes. No conglutinate apparent. **40.** *Pegias fabula*. OSUM 41309. Little South Fork Cumberland River, KY. Marsupial region of gill, split to show glochidia. No conglutinate apparent. **41.** *Plethobasus cyphyus*. OSUM 47973. Muskingum River, OH. Glochidia bound with egg membranes into conglutinate. Note tightly bound egg membranes. **42.** *Pleurobema clava*. OSUM 20744. Little Darby Creek, OH. Oblique section of marsupium with glochidia very weakly bound with egg membranes into conglutinate. Two water tubes are present.

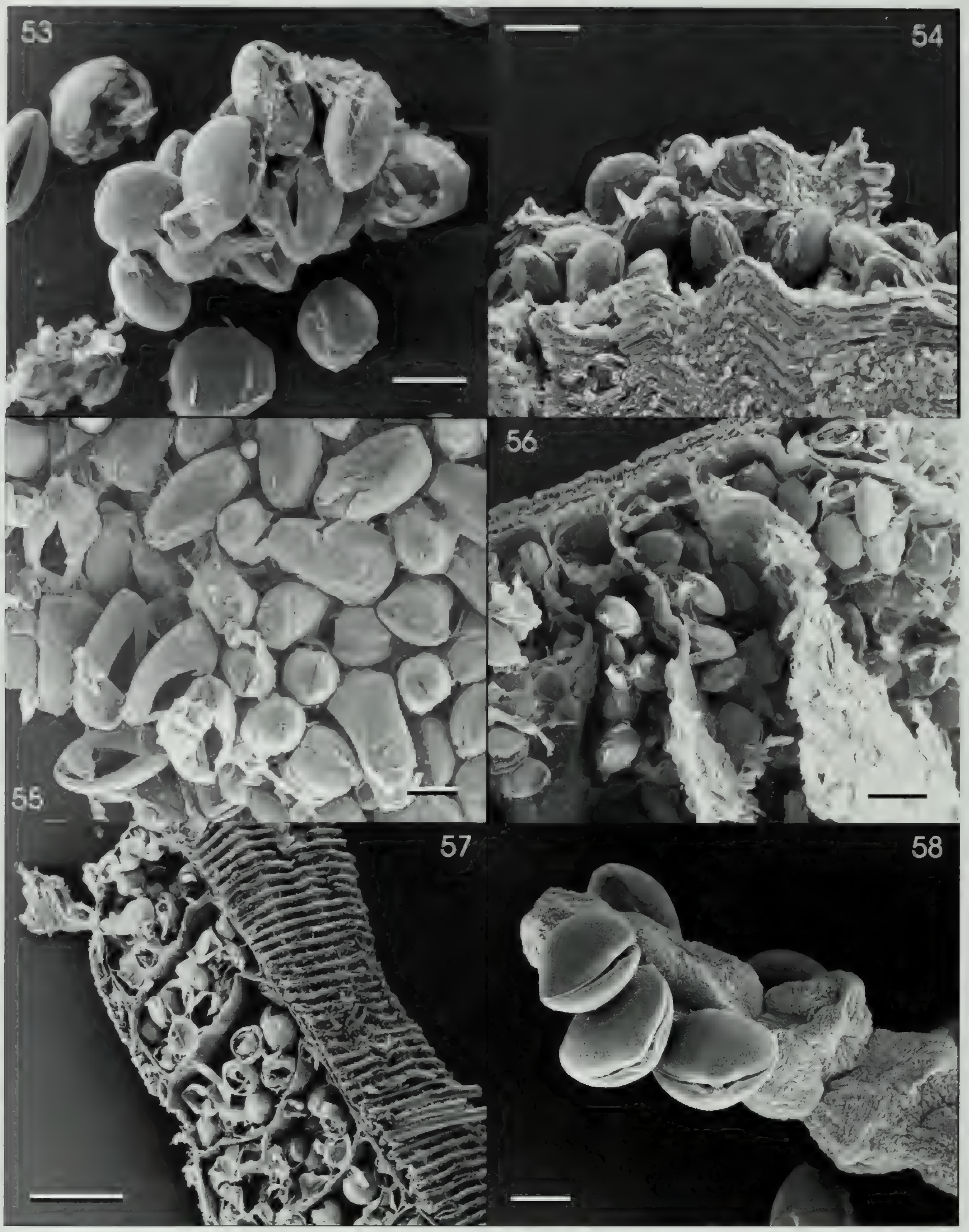


Figures 43-46. Scale bars = 500 μ unless noted otherwise.

43. *Pleurobema cordatum*. OSUM 67858. Muskingum River, OH. Glochidia bound with egg membranes into conglutinate. **44.** *Pleurobema sintoxia*. OSUM 19600. Lake Erie, OH. Glochidia bound with egg membranes into conglutinate. **45.** *Ptychobranchus fasciolaris*. Ex. G. Watters. Little Darby Creek, OH. Entire metaconglutinate. Adhesive "tail" to left, fluid filled "head" to right. Eyespot at arrow. Scale bar = 1 mm. **46.** *Ptychobranchus greeni*. OSUM 19025. Conasauga River, GA. Entire metaconglutinate. Adhesive "tail" to left, fluid filled "head" to right. Eyespot at arrow.

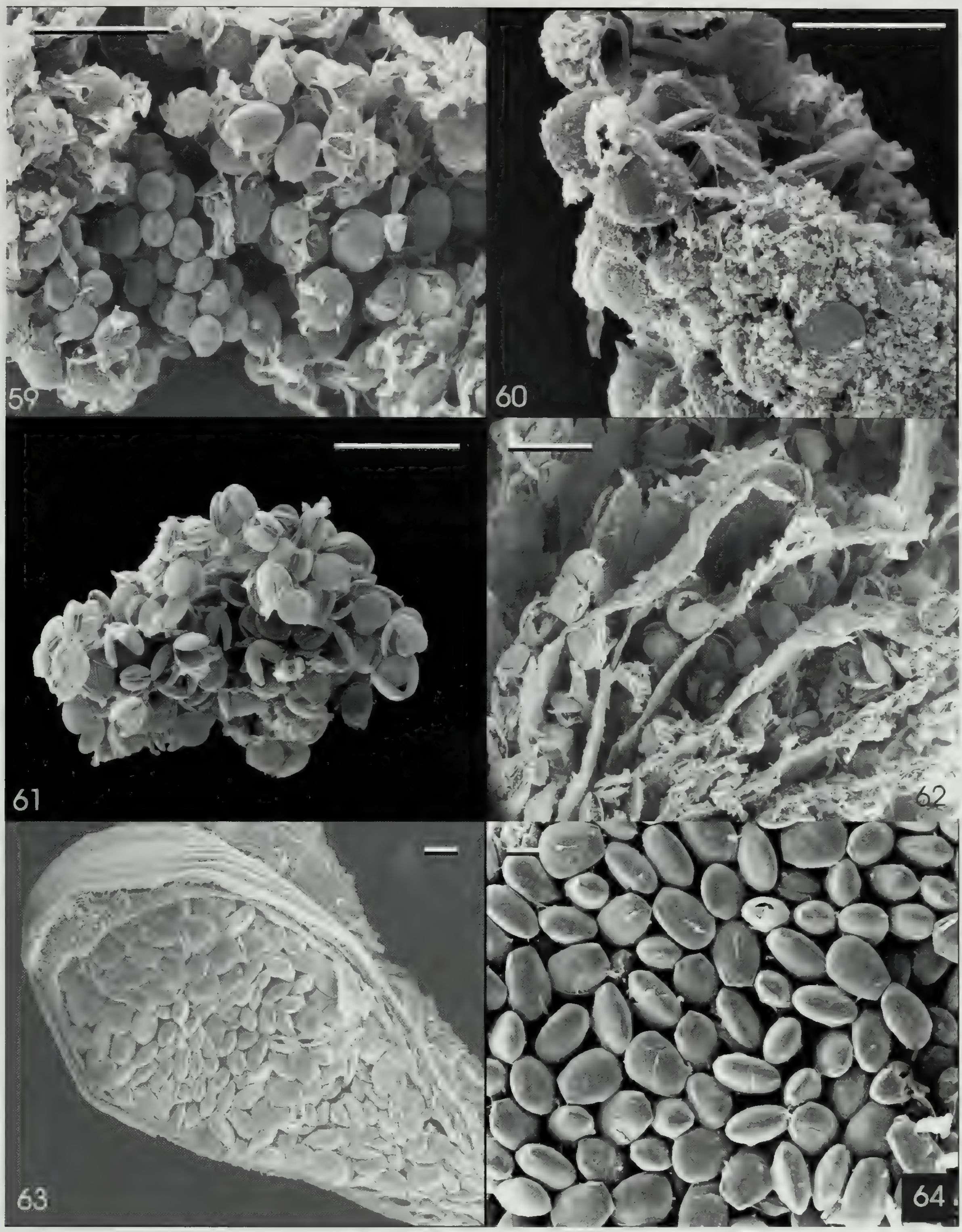


Figures 47-52. Scale bars = 200 μ unless noted otherwise. **47.** *Ptychobranchus fasciolaris*. Ex. G. Watters. Little Darby Creek, OH. Cross section through metaconglutinate showing glochidia in central core. **48, 49, 50.** *Ptychobranchus subtentum*. OSUM 24139. North Fork Holston River, VA. Close-up of adhesive pad. Fig. 49 is the enclosed area in Fig. 48. Note spongy structure of pad and presumed "glue balls" at arrows. Fig. 49 - Scale bar = 50 μ. Fig. 50 - Scale bar = 20 μ. **51.** *Quadrula cylindrica*. Ex. G. Watters. Tippecanoe River, IN. Glochidia with remnants of egg membranes, weakly held together by mucus or egg membranes. FIG. **52.** *Quadrula metanevra*. Ex. G. Watters. Muskingum River, OH. Glochidia with remnants of egg membranes. No conglutinate apparent.



Figures 53-58. Scale bars = 200 μ unless noted otherwise.

53. *Quadrula pustulosa*. OSUM 8367. Big Darby Creek, OH. Glochidia with remnants of egg membranes, weakly held together by mucus or egg membranes. **54.** *Quincuncina kleiniana*. OSUM 48537. Suwannee River, FL. Longitudinal section through marsupium with glochidia bound in amorphous mucus conglutinate.
55. *Potamilus alatus*. OSUM 59992. Ohio Brush Creek, OH. Glochidia with remnants of egg membranes. No conglutinate apparent. **56.** *Pyganodon grandis*. OSUM 48296. Ohio & Erie Canal, OH. Longitudinal section of marsupium with glochidia. No conglutinate apparent. Scale bar = 500 μ. **57.** *Strophitus conasaugaensis*. OSUM 57979. Oakmulgee Creek, AL. Longitudinal section of marsupium with glochidia. No conglutinate apparent. Scale bar = 500 μ. **58.** *Strophitus undulatus*. Ex. G. Watters. Little Darby Creek, OH. Partial mesoconglutinate with tethered glochidia.



Figures 59-64. Scale bars = 200 μ unless noted otherwise.

59. *Toxolasma parvum*. OSUM 12071. Olentangy River, OH. Composite conglutinate C with untethered glochidia imbedded in unfertilized eggs. **60.** *Quadrula verrucosa*. OSUM 3597. Big Darby Creek, OH. Glochidia bound in amorphous mucus conglutinate. **61.** *Truncilla truncata*. OSUM 18018. Ohio River, OH. Glochidia with remnants of egg membranes. No conglutinate apparent. **62.** *Utterbackia imbecillis*. OSUM 8789. Scioto River, OH. Longitudinal section of marsupium with glochidia. No conglutinate apparent. Scale bar = 500 μ. **63.** *Venustaconcha ellipsiformis*. OSUM 15407. Big Piney River, MO. Cross section of marsupium with glochidia. No conglutinate apparent. **64.** *Villosa lienosa*. OSUM 19992. Little River, MO. Glochidia. No conglutinate apparent.

TABLE 1. Taxa, source, and general collection locale for taxa used in study. (OSUM – Ohio State University Museum of Biological Diversity).

1. *Actinonaias ligamentina* (Lamarck, 1819). OSUM 5980. St. Joseph River, OH
2. *Alasmidonta marginata* Say, 1818. OSUM 13743. Caddo River, AK
3. *Alasmidonta viridis* (Rafinesque, 1820). OSUM 21560. Little Darby Creek, OH
4. *Amblema plicata* (Say, 1817). OSUM 48918. Muskingum River, OH
5. *Anodontoides ferussacianus* (Lea, 1834). OSUM 31265. French Creek, PA
6. *Anodonta suborbiculata* Say, 1831. OSUM 13634. Black River, MO
7. *Arcidens confragosus* (Say, 1829). OSUM 52015. Green River, KY
8. *Cumberlandia monodonta* (Say, 1829). Ex. M. Hove. St. Croix River, MN
9. *Cyclonaias tuberculata* (Rafinesque, 1820). OSUM 14138. Sandusky River, OH
10. *Cyprogenia stegaria* (Rafinesque, 1820). OSUM 16757. Clinch River, TN
11. *Crytonaias tampicoensis* (Lea, 1838). OSUM 15806. Nueces River, TX
12. *Dromus dromas* (Lea, 1834). Ex. R. Neves. Clinch River, VA
13. *Elliptio crassidens* (Lamarck, 1819). OSUM 15194. Tennessee River, TN
14. *Elliptio spinosa* (Lea, 1836). OSUM 41069. Altamaha River, GA
15. *Epioblasma torulosa rangiana* (Lea, 1838). OSUM 40562. Allegheny River, PA.
16. *Epioblasma triquetra* (Rafinesque, 1820). OSUM 59432. South Fork Scioto Brush Creek, OH
17. *Fusconaia flava* (Rafinesque, 1820). Ex. G. Watters. St. Joseph River. OH
18. *Fusconaia maculata* (Rafinesque, 1820). Ex. G. Zimmerman. Allegheny River, PA
19. *Fusconaia ozarkensis* (Call, 1887). OSUM 54549. War Eagle Creek, AK
20. *Glebula rotundata* (Lamarck, 1819). OSUM 15704. Bayou Teche, LA
21. *Gonidea angulata* (Lea, 1838). OSUM 8550. Trinity River, CA
22. *Lampsilis radiata luteola* (Lamarck, 1819). OSUM 63569. Lake Erie, OH
23. *Lampsilis teres* (Rafinesque, 1820). OSUM 43079. St. Francis River. AK.
24. *Lasmigona complanata* (Barnes, 1823). OSUM 29762. West Branch St. Joseph River, OH
25. *Lasmigona compressa* (Lea, 1829). OSUM 67876. Fish Creek, OH
26. *Lasmigona costata* (Rafinesque, 1820). OSUM 65201. Grand River, OH
27. *Lasmigona holstonia* (Lea, 1838). OSUM 25294. Middle Fork Holston River, VA
28. *Leptodea fragilis* (Rafinesque, 1820). OSUM 63566. Lake Erie, OH
29. *Leptodea ochracea* (Say, 1817). OSUM 52455. Mashpee Pond, MA
30. *Lexingtonia dolabelloides* (Lea, 1840). OSUM 30251. Tennessee River, TN
31. *Lemiox rimosus* (Rafinesque, 1831). OSUM 33955. Duck River, TN
32. *Ligumia nasuta* (Say, 1817). OSUM 20398. Lake Erie, OH
33. *Ligumia recta* (Lamarck, 1819). Ex. P. Morrison. Ohio River, WV
34. *Medionidus acutissimus* (Lea, 1831). OSUM 42808. Conasauga River, TN
35. *Obliquaria reflexa* Rafinesque, 1820. Ex. G. Watters. Muskingum River, OH
36. *Obovaria subrotunda* (Rafinesque, 1820). OSUM 61880. Little Muskingum River, OH
37. *Pegias fabula* (Lea, 1838). OSUM 41309. Little South Fork Cumberland River, KY
38. *Plethobasus cyphyus* (Rafinesque, 1820). OSUM 47973. Muskingum River, OH
39. *Pleurobema clava* (Lamarck, 1819). OSUM 20744. Little Darby Creek, OH
40. *Pleurobema cordatum* (Rafinesque, 1820). OSUM 67858. Muskingum River, OH
41. *Pleurobema sintoxia* (Rafinesque, 1820). OSUM 19600. Lake Erie, OH
42. *Ptychobranchus fasciolaris* (Rafinesque, 1820). Ex. G. Watters. Little Darby Creek, OH
43. *Ptychobranchus greeni* (Conrad, 1834). OSUM 19025. Conasauga River, GA
44. *Ptychobranchus subtentum* (Say, 1825). OSUM 24139. North Fork Holston River, VA
45. *Quadrula cylindrica* (Say, 1817). Ex. G. Watters. Tippecanoe River, IN
46. *Quadrula metanevra* (Rafinesque, 1820). Ex. G. Watters. Muskingum River, OH
47. *Quadrula pustulosa* (Lea, 1831). OSUM 8367. Big Darby Creek, OH
48. *Quadrula verrucosa* (Rafinesque, 1820). OSUM 3597. Big Darby Creek, OH
49. *Quincuncina kleiniana* (Lea, 1852). OSUM 48537. Suwannee River, FL
50. *Potamilus alatus* (Say, 1817). OSUM 59992. Ohio Brush Creek, OH
51. *Pyganodon grandis* (Say, 1829). OSUM 48296. Ohio & Erie Canal, OH
52. *Simpsonaias ambigua* (Say, 1825). OSUM 55995. Wisconsin River, WI
53. *Strophitus conasaugaensis* (Lea, 1857). OSUM 57979. Oakmulgee Creek, AL
54. *Strophitus undulatus* (Say, 1817). Ex. G. Watters. Little Darby Creek, OH
55. *Toxolasma parvum* (Barnes, 1823). OSUM 12071. Olentangy River, OH
56. *Truncilla truncata* Rafinesque, 1820. OSUM 18018. Ohio River, OH

57. *Utterbackia imbecillis* (Say, 1829). OSUM 8789. Scioto River, OH
58. *Venustaconcha ellipsiformis* (Conrad, 1836). OSUM 15407. Pig Piney River, MO
59. *Villosa iris* (Lea, 1829). OSUM 20013. Walhonding River, OH
60. *Villosa lienosa* (Conrad, 1834). OSUM 19992. Little River, MO

TABLE 2. Types of conglutinate-like structures found in the examined species.

No conglutinate or temporary conglutinate weakly held together, disassociating in water
- "Anodontinae"
  - *Alasmidonta marginata*
  - *Alasmidonta viridis*
  - *Anodontoides ferussacianus*
  - *Arcidens confragosus*
  - *Pegias fabula*
  - *Pyganodon grandis*
  - *Simpsonaias ambigua*

- "Lampsilinae"
  - *Actinonaias ligamentina*
  - *Crytonaias tampicoensis*
  - *Ellipsaria lineolata*
  - *Epioblasma torulosa rangiana*
  - *Epioblasma triquetra*
  - *Glebula rotundata*
  - *Lampsilis radiata luteola*
  - *Lampsilis teres*
  - *Leptodea fragilis*
  - *Leptodea ochracea*
  - *Ligumia nasuta*
  - *Ligumia recta*
  - *Medionidus acutissimus*
  - *Obovaria subtotunda*
  - *Potamilus alatus*
  - *Truncilla truncata*
  - *Villosa iris*
  - *Villosa lienosa*

Amorphous mucus conglutinate
- "Ambleminae"
  - *Amblema plicata*
  - *Gonidea angulata*
  - *Megalonaias nervosa*
  - *Quadrula cylindrica*
  - *Quadrula metanevra*
  - *Quadrula pustulosa*
  - *Quadrula verrucosa*
  - *Quincuncina kleiniana*

- Margaritiferidae
  - *Cumberlandia monodonta*

Simple conglutinate held together by egg membranes
    Nonelastic
        Cyclonaias tuberculata
        Elliptio crassidens
        Elliptio spinosa
        Lemiox rimosus
        Plethobasus cyphyus
        Pleurobema clava
        Pleurobema cordatum
        Pleurobema sintoxia

    Elastic
        Obliquaria reflexa

Composite conglutinate A – glochidia untethered, embedded in egg core
        Fusconaia flava
        Fusconaia maculata
        Fusconaia ozarkensis
        Toxolasma parvum

Composite conglutinate B – central ribbon of eggs, lateral glochidia
        Dromus dromas
        ? *Cyprogenia stegaria* (central core of eggs)

Composite conglutinate C – glochidia tethered, embedded in egg core
        Lasmigona complanata
        Lasmigona compressa
        Lasmigona costata
        Lasmigona holstonia

Mesoconglutinate – glochidia tethered in solid mucus conglutinate
        Strophitus conasaugaensis
        Strophitus undulatus

Metaconglutinate – multilayer conglutinate with central core of glochidia
        Ptychobranchus fasciolaris
        Ptychobranchus greeni
        Ptychobranchus subtentum

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Mayr, E. 1989. Attaching names to objects. In: *What the philosophy of biology is : essays for David Hull* (M. Ruse. ed.). Klumer Academic, Dordrecht: 235-243.

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Mayr, E. 1989. Attaching names to objects. In: *What the philosophy of biology is : essays for David Hull* (M. Ruse. ed.). Klumer Academic, Dordrecht: 235-243.

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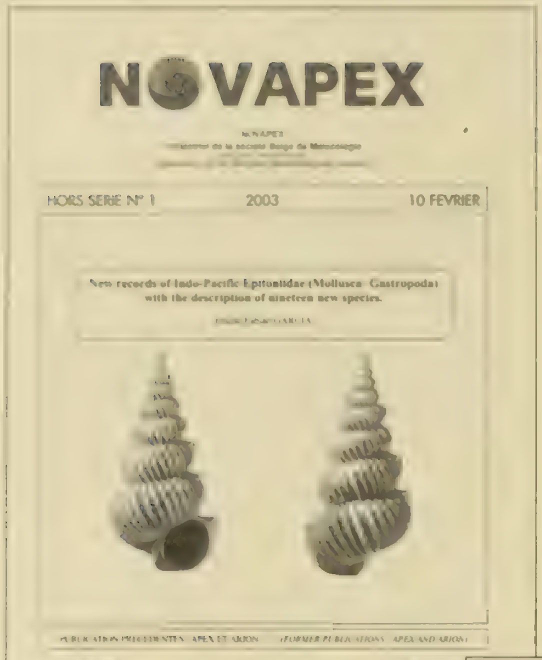

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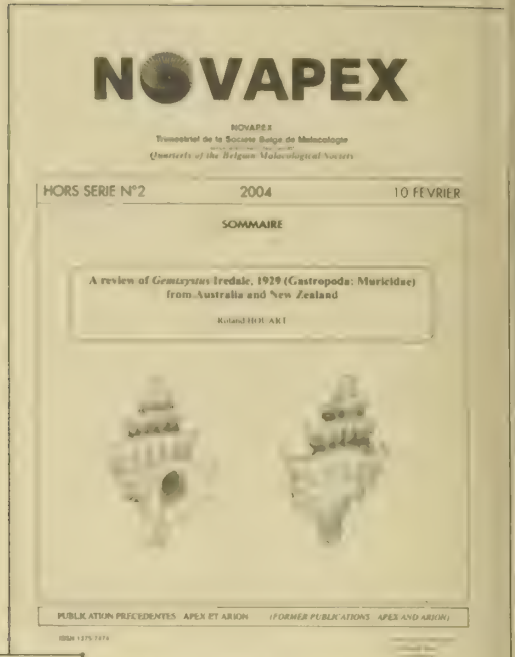

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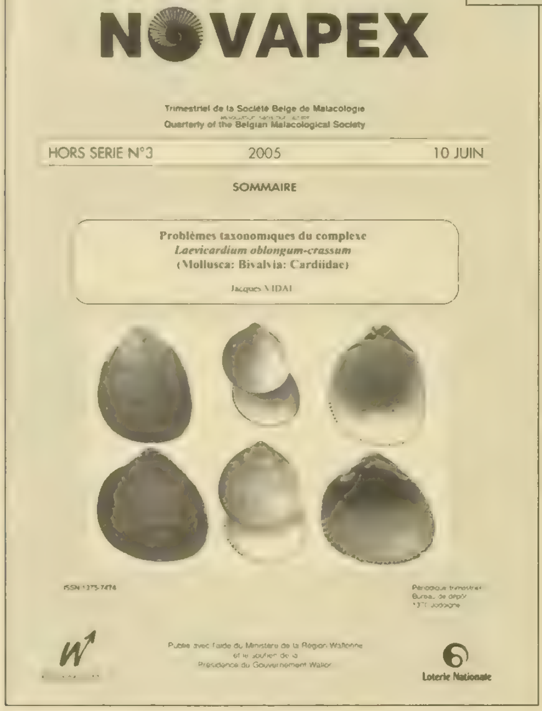

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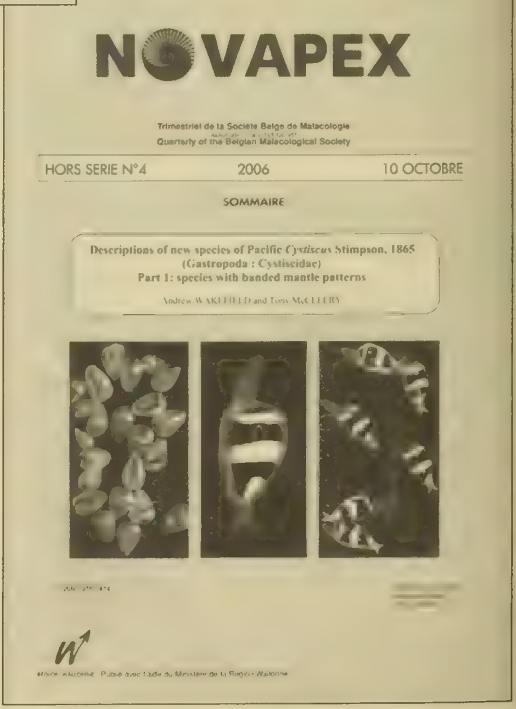

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